U.S. Army Center for Health Promotion and Preventive Medicine

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TRAINING MUNITIONS HEALTH RISK
ASSESSMENT
NO. 39-EJ-1485-00
RESIDENTIAL EXPOSURE FROM INHALATION OF
AIR EMISSIONS FROM THE
M1A1 .50 CALIBER BLANK CARTRIDGE
DEPARTMENT OF DEFENSE IDENTIFICATION CODE: A559



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U.S. Army Center for Health Promotion and Preventive Medicine

The lineage of the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) can be traced back over 50 years. This organization began as the U.S. Army Industrial Hygiene Laboratory, established during the industrial buildup for World War II, under the direct supervision of the Army Surgeon General. Its original location was at the Johns Hopkins School of Hygiene and Public Health. Its mission was to conduct occupational health surveys and investigations within the Department of Defense's (DOD's) industrial production base. It was staffed with three personnel and had a limited annual operating budget of three thousand dollars.

Most recently, it became internationally known as the U.S. Army Environmental Hygiene Agency (AEHA). Its mission expanded to support worldwide preventive medicine programs of the Army, DOD, and other Federal agencies as directed by the Army Medical Command or the Office of The Surgeon General, through consultations, support services, investigations, on-site visits, and training.

On 1 August 1994, AEHA was redesignated the U.S. Army Center for Health Promotion and Preventive Medicine with a provisional status and a commanding general officer. On 1 October 1995, the nonprovisional status was approved with a mission of providing preventive medicine and health promotion leadership, direction, and services for America's Army.

The organization's quest has always been one of excellence and the provision of quality service. Today, its goal is to be an established world-class center of excellence for achieving and maintaining a fit, healthy, and ready force. To achieve that end, the CHPPM holds firmly to its values which are steeped in rich military heritage:

- **★** Integrity is the foundation
 - ★ Excellence is the standard
 - * Customer satisfaction is the focus
 - ★ Its people are the most valued resource
 - ★ Continuous quality improvement is the pathway

This organization stands on the threshold of even greater challenges and responsibilities. It has been reorganized and reengineered to support the Army of the future. The CHPPM now has three direct support activities located in Fort Meade, Maryland; Fort McPherson, Georgia; and Fitzsimons Army Medical Center, Aurora, Colorado; to provide responsive regional health promotion and preventive medicine support across the U.S. There are also two CHPPM overseas commands in Landstuhl, Germany and Camp Zama, Japan who contribute to the success of CHPPM's increasing global mission. As CHPPM moves into the 21st Century, new programs relating to fitness, health promotion, wellness, and disease surveillance are being added. As always, CHPPM stands firm in its commitment to Army readiness. It is an organization proud of its fine history, yet equally excited about its challenging future.

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TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE M1A1 .50 CALIBER BLANK CARTRIDGE

EXECUTIVE SUMMARY

This assessment evaluated the potential for human health effects to offsite residents breathing air emissions following use of the M1A1 .50 Caliber Blank Cartridge (M1A1) on firing ranges during training exercises.

To conduct this assessment, air emissions from the M1A1 were collected in a test chamber at the U.S. Army Aberdeen Test Center, Maryland. The data collected from the Firing Point Emission Study provided the amount and types of substances released from the M1A1. This information was then used in an air dispersion model to determine ambient air concentrations at locations downwind from the M1A1 firing location. Since the training facility in this assessment is hypothetical, the air model used assumptions that provided conservative estimates of air concentrations.

Modeled air concentrations were combined with exposure information (e.g., number of cartridges used per year) to estimate the amount of each substance the hypothetical resident breathes. This estimate was then compared with the substance's health-based screening level, which was obtained from agencies such as the U.S. Environmental Protection Agency, to determine if there is a potential for health effects from inhalation of these substances.

The health risk assessment included both long-term (30 years) and short-term (15-minute or 1-hour) exposures to modeled substance concentrations. Assessment results, generated using conservative methods, showed that the hypothetical offsite resident breathing air as close as 200 meters (656 feet) from the M1A1 firing location is safe from these emissions. At locations where offsite residents are located less than 200 meters from the M1A1 firing locations, a more site-specific evaluation is necessary. It should be noted that at most training installations, training areas are over 1,000 meters (over half a mile) away from populated areas.

Readiness thru Health

TABLE OF CONTENTS

1. PURPOSE	
2. AUTHORITY	
3. REFERENCES	
4. BACKGROUND	
4.1 CARTRIDGES AND THEIR USE	
4.2 WHAT IS THE M1A1?	
4.3 USE OF THE M1A1	
4.4 ASSESSMENT SUMMARY	
5. DATA COLLECTION AND AIR MODELING	3
5.1 EMISSION FACTORS	3
5.2 BACKGROUND AND DESCRIPTION	3
5.3 MODEL ASSUMPTIONS	3
5.4 GENERAL METHODOLOGY	5
5.5 USE OF MODEL OUTPUT	5
5.6 DETERMINATION OF SUBSTANCE-SPECIFIC EMISSION RATES	-
6. RISK ASSESSMENT	7
6.1 EXPOSURE ASSUMPTIONS	
6.2 TIME-AVERAGING	7
6.3 TOXICITY ASSESSMENT	
7. RISK CHARACTERIZATION	14
7.1 CHRONIC HEALTH RISK	14
7.2 ACUTE HEALTH RISK	14
7.3 FACT SHEET	15
8. UNCERTAINTY DISCUSSION	15
9. CONCLUSION	17
10. RECOMMENDATIONS	17
11. POINT OF CONTACT	18

LIST OF APPENDICES

REFERENCES	APPENDIX A
AIR DISPERSION MODELING OUTPUT DATA	APPENDIX B
HEALTH-BASED SCREENING LEVELS	
AND ACUTE TOXICITY VALUES	APPENDIX C
RISK ASSESSMENT DATA	APPENDIX D
FACT SHEET SUBMITTED TO THE U.S. ARMY ENVIRONMENTAL	
CENTER	APPENDIX E
LIST OF TABLES	
TABLE 1 – SOURCE PARAMETERS	4
TABLE 2 - WORST-CASE METEOROLOGICAL PARAMETERS	
TABLE 3 - AIR MODEL INPUT PARAMETERS	
TABLE 4 - FREQUENCY OF USE FOR THE M1A1	
TABLE 5 – EXPOSURE PARAMETERS USED TO DETERMINE	
TIME-AVERAGED CHRONIC AIR CONCENTRATIONS	8
TABLE 6 – SUMMARY OF RfCs USED FOR PETROLEUM	
HYDROCARBONS	12
TABLE 7- TYPES OF LINCERTAINTY	40

LIST OF ACRONYMS

AEC U.S. Army Environmental Center

AEGL Acute Exposure Guideline Levels

AIHA American Industrial Hygiene Association

Al Aluminum

ATC U.S. Army Aberdeen Test Center

ATSDR Agency for Toxic Substances and Disease Registry

ATV Acute Toxicity Value

CO₂ Carbon Dioxide

DODIC Department of Defense Identification Code

DOE U.S. Department of Energy

EPA U.S. Environmental Protection Agency

ERPG Emergency Response Planning Guidelines

HBSL Health-Based Screening Level

INPUFF Integrated PUFF Model

NAAQS National Ambient Air Quality Standards

NEW Net Explosive Weight

OEL Occupational Exposure Limit

PM₁₀ Particulate Matter under 10 microns in size

PRG Preliminary Remediation Goals

RBC Risk-Based Concentration

RfC Reference Concentration

TEEL Temporary Emergency Exposure Limits

TPH Total Petroleum Hydrocarbons

TSP Total Suspended Particulates

USACHPPM U.S. Army Center for Health Promotion and Preventive Medicine

TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE M1A1 .50 CALIBER BLANK CARTRIDGE

1. PURPOSE

This document presents the assessment of the potential for human health effects to offsite residents breathing air emissions following use of the M1A1 .50 Caliber Blank Cartridge (M1A1) on firing ranges during training exercises.

2. AUTHORITY

Memorandum, U.S. Army Environmental Center, 4 June 1999, Subject: Pyrotechnics Risk Assessment.

3. REFERENCES

See Appendix A for a list of references.

4. BACKGROUND

4.1 CARTRIDGES AND THEIR USE

Cartridges are cases that contain a primer, propelling charge, and projectile. The primer is needed to activate the propelling charge, which provides the force to send the projectile to a target. Examples of projectiles include bullets, rockets, and missiles. Cartridges are also referred to as "rounds" and are fired from weapons such as pistols or rifles.

4.2 WHAT IS THE M1A1?

The M1A1 is a blank cartridge used in training exercises. It can be identified by the rosette crimp at the mouth and absence of a bullet (Reference 1). Each cartridge is about the length of a soda can.

The M1A1 is a blank cartridge consisting of a brass cartridge case. It also contains a propelling charge that is made up mostly of nitrocellulose and nitroglycerine. Nitrocellulose is commonly used in the production of lacquers and artificial leathers. Nitroglycerine is a component in dynamite and is used for military and industrial purposes, such as mining and demolition.

4.3 USE OF THE M1A1

The M1A1 is used to simulate firing in training exercises. It is fired from .50 caliber machine guns. A device is attached to the gun to allow for firing with blank

ammunition (Reference 1). Firing with blank ammunition allows soldiers to safely simulate combat and practice using weapons.

4.4 ASSESSMENT SUMMARY

The general assessment approach consisted of two main parts: air dispersion modeling and exposure assessment, which are briefly discussed in the paragraphs below. Sections 5 through 7 present a discussion of the methodology used for this assessment.

Emissions data used in the air dispersion modeling was obtained from the Firing Point Emission Study, conducted by the U.S. Army Aberdeen Test Center (ATC), at Aberdeen Proving Ground, Maryland (Reference 2). This study was funded by the U.S. Army Environmental Center (AEC) with the purpose of identifying and quantifying emissions from weapons firing. Data from this study was generated by firing munitions with weapons that are representative of those used by the U.S. Army during training operations. Emissions data for the M1A1 was generated by firing the it from the M2 machine gun.

The emissions data for the M1A1 was used with an atmospheric dispersion model to estimate the average concentrations that may be experienced by an offsite resident. Since this assessment is designed to provide results that would be applicable to most Army training facilities, the training area used in this assessment was a hypothetical one. While most training areas are at least 1,000 meters away from populated areas, as a conservative distance, it was initially assumed that a person could reside 100 meters downwind from the firing point (location where the machine gun is positioned). In addition, air-modeling parameters were selected to mimic worst-case conditions.

The exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. For the purpose of this assessment, air concentrations were averaged over 30 years for chronic exposures and 1-hour or 15 minutes for acute exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic health-based screening levels (HBSLs) established by the U.S. Environmental Protection Agency (EPA) or acute toxicity values (ATVs) established by selected agencies depending on the exposure duration (i.e., 30 years versus 1-hour or 15 minutes). The comparison was made using the ratio of the HBSL or ATV to estimated air concentration for each of the substances evaluated. If this ratio was less than one, no further evaluation was needed. This approach is conservative because the exposure assumptions used by the agencies, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near firing ranges. If the chronic or acute averaged concentrations (C_{chronic} and C_{acute}) were greater than these screening levels, further analysis would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather the potential for such.

5. DATA COLLECTION AND AIR MODELING

5.1 EMISSION FACTORS

Emission factors, used to derive the air modeling emission rates used in this assessment, were generated from the Firing Point Emission Study conducted by the ATC (Reference 2). This study identified and quantified air emissions from the firing of the M1A1 from the M2 machine gun. The data provided by the ATC included the net explosive weight (NEW) of the M1A1, the substances sampled, and substance-specific emission factors. Emissions data from the Firing Point Emission Study are included in the first four columns of the table located in Appendix B.

5.2 BACKGROUND AND DESCRIPTION

Air dispersion models are available to mathematically simulate plume behavior and to estimate downwind concentrations of substances emitted from various sources. However, specific models are not available to determine the dispersion of emissions from munitions used during training. Estimating the magnitude and location of these concentrations depends on many factors including the amount and type of emissions, the behavior of the source, and meteorological conditions. Since a specific model is not available for modeling the use of munitions during training, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) evaluated numerous air models to determine which would be suitable for use with munitions used during training. The USACHPPM recommended using the Integrated PUFF (INPUFF) model to estimate the dispersion of emissions from various munitions sources (Reference 3).

The INPUFF Model (Reference 4) was developed to simulate dispersion from instantaneous or semi-continuous point sources. This Gaussian-integrated puff model is capable of addressing a cloud type release over short periods of time, and computations can be performed for a single point source for multiple receptors. The algorithms used to calculate concentrations assume a vertically uniform wind direction (with no chemical reaction) to compute the contribution of each cloud at a receptor for each time step/interval.

5.3 MODEL ASSUMPTIONS

Some assumptions were made to best represent the firing of the M1A1 cartridges. These assumptions were as follows:

Typically, with conventional point sources (such as incinerators), the cloud rise and formation are determined by characterizing flue gas exit velocity, temperature, and stack diameter. The M1A1 cartridges are used in conjunction with machine guns. For unconventional sources with no real physical stack dimensions, such as machine guns, the stack height and diameter were assumed to be equal to the height of the barrel and the bore diameter. No exit velocity was used with this source because the emission rated generated from the test data were obtained from sampling a stabilized

cloud with no exit velocity. Table 1 includes the source parameters used to model the M1A1 cartridges.

TABLE 1: SOURCE PARAMETERS

Parameter	Model Input
Source/Stack Diameter	0.01 meters
Source/Stack Height	1 meter
Source Exit Temperature	298.15 degrees Kelvin (°K) (or 77 °F)
Exit Velocity	0 meters/second
Initial horizontal dispersion coefficient (σ_y)	0.87 meters
Initial vertical dispersion coefficient (σ_z)	1.07 meters

- Initial cloud dimensions are preferred to model the air emissions from these types of releases. Typically, these dimensions are used to define the initial horizontal and vertical dispersion values (σ_y and σ_z) of the released cloud. However, this information was not measured during the studies at the ATC; therefore, the cloud dimensions were based on the test chamber dimensions and the volume of air sampled. By assuming an elliptical cloud with the prevailing wind direction being perpendicular to the muzzle when fired, the test chamber's radius would be equal to the initial vertical dispersion (σ_z), and the initial horizontal dispersion (σ_y), would be equal to one half the length of the test chamber. The cloud exit temperature was assumed to be equal to the test chamber temperature.
- For the purposes of this assessment, a hypothetical offsite resident was assumed to be located first at 100 meters, then at 200 meters directly downwind from the source. The meander of the cloud is a major factor when estimating concentrations at given locations downwind from the source. Assuming that the resident is directly downwind from the source is the same as assuming that there is no cloud meander and the center of the cloud migrates directly over the hypothetical offsite resident. This assumption provides the most conservative modeled concentrations.
- Since this assessment does not look at a specific training site, generic, worst-case meteorological data were used. To determine the worst-case meteorological conditions that would result in the highest air emission concentrations, the modeling was performed using the EPA Risk Management Program Guidance (Reference 5). This guidance includes tables for estimating the footprint of chemical releases and is intended to inform emergency responders of potential accidental releases. The EPA has defined most default conditions for meteorological modeling parameters. Table 2 lists the meteorological parameters that were used in the air model.

TABLE 2: WORST-CASE METEOROLOGICAL PARAMETERS

Parameter	Input Value
Wind Speed	1 meter/second
Atmospheric Stability	Category F
Wind Direction	270°
Ambient Temperature	293 degrees Kelvin (°K) (or 68 °F)

5.4 GENERAL METHODOLOGY

The model was run for a total calculation time of 200 seconds for the 100-meter location and 300 seconds for the 200-meter location. This was done to simulate a single round being fired and to ensure that the total mass of the cloud had passed the hypothetical resident locations. Concentrations were calculated every 2 or 3 seconds, depending on the location being modeled. The model results indicated that the initial cloud reached the hypothetical offsite resident at 200 meters within 154 seconds and dissipated below the lowest concentration the model calculated, which in this instance $(1 \times 10^{-12} \, \text{g/m}^3)$ occurred within 275 seconds. Table 3 contains the air model input parameters used in this assessment.

TABLE 3: AIR MODEL INPUT PARAMETERS

Parameter	Input	Value
i didineter	100 meters	200 meters
Number of meteorological periods (NTIME)	1	1
Duration of each meteorological period (ITIME)	200 seconds	300 seconds
Number of updates to the source (NSRCDS)	100	100
Duration/time step between each source update (ISUPDT)	2 seconds	3 seconds
Total time modeled/Simulation Period (NTIME) (ITIME)= (NSRCDS) (ISUPDT)	200 seconds	300 seconds

5.5 USE OF MODEL OUTPUT

The concentrations provided by the INPUFF model were based on a unit emission rate (ER_{unit}) of 1 gram/second from an emission source, and did not represent any substance-specific concentrations from the use of any weapons system. This unit emission rate is typically used for ease of modeling purposes. The relationship between the emission rate and predicted concentration is linear. Therefore, the ratio of the predicted concentration to the unit emission rate was multiplied by each substance-specific emission rate to provide substance-specific concentrations.

5.6 DETERMINATION OF SUBSTANCE-SPECIFIC EMISSION RATES

The actual substance emission rate for one item (ER_1) for each substance was calculated using Equation 1. Example 1 contains a sample calculation using this equation.

$$ER_1 = \frac{EF \cdot CV}{t}$$
 Equation 1

Where:

 ER_1 = emission rate for one item ((g/item)/sec)

EF = average adjusted emission factor (lb/item)

CV = conversion factor (453.59 g/lb)

t = release duration obtained from the INPUFF model (sec)

Example 1 Sample Calculation Using Equation 1:

$$ER_1 = \frac{(2.11E-03)(453.59)}{(3)}$$

= 3.191 E-01 g/sec

Calculation provided for Carbon Dioxide (CO₂) at the 200-meter location. Appendix B provides the average adjusted emission factor of CO₂ in lb/item.

Substance-specific ambient concentrations for one item (CONC) were calculated using Equation 2. A sample calculation using this equation is provided in Example 2. Appendix B contains the estimated air concentrations for both the 100 and 200-meter locations.

$$CONC = ER_1 \cdot \frac{UC}{ER_{unit}}$$

Equation 2

Where:

CONC = substance concentration based on one item (g/m³)

 ER_1 = emission rate for one item (g/sec)

ER_{unit} = unit emission rate as used in the model (g/sec)

UC = concentration based on the unit emission rate (g/m³)

Example 2 Sample Calculation Using Equation 2:

$$CONC = (3.191E - 01) \frac{(6.870E - 05)}{(1)}$$

 $= 2.192E-05 g/m^3$

Calculation provided for CO₂ at the 200-meter location.

6. RISK ASSESSMENT

6.1 EXPOSURE ASSUMPTIONS

Exposure assumptions were selected using a typical use scenario for the M1A1 during training exercises. The typical use scenario was provided by the AEC and is based on consultation with their senior training advisor (References 6, 7). The frequency of use for the M1A1 was required to determine how much substance an offsite resident would be exposed to in the time period of interest (i.e., acute or chronic exposure). Table 4 summarizes the general use scenario for the M1A1.

TABLE 4: FREQUENCY OF USE FOR THE M1A1

Parameter	Value Used
Number of cartridges used per year	123,600
Maximum number of cartridges used in one hour	3,000

6.2 TIME-AVERAGING

For the chronic assessment, time-averaged concentrations were calculated by assuming that the hypothetical resident would be exposed for 30 years. This is consistent with the exposure duration used by the EPA, which assumes that the resident spends 30 years at the same residence. By using the same exposure duration, the estimated time-averaged concentrations could be compared with their respective HBSLs, which are derived using standard EPA default assumptions.

Using the default residence time established by the EPA, the assumption was made that someone could be exposed to air emissions from 123,600 cartridges per year for 30 years. Table 5 lists the exposure parameters used to estimate concentrations for the chronic assessment. These parameters are based on the typical use scenario provided by the AEC (Table 4) and the assumptions used in the air model run.

TABLE 5: EXPOSURE PARAMETERS USED TO DETERMINE TIME-AVERAGED CHRONIC AIR CONCENTRATIONS

Exposure Parameter	Value	Used
Exposure i aranietei	100 meters	200 meters
Exposure Time (ET _{ctg})	3.333 min/cartridge ¹	5 min/cartridge ¹
Exposure Frequency (EF _{ctg})	123,600 ca	rtridges/year
Exposure Duration (ED)		ears ²
¹ Based on the total model time of 200 seconds (3.33 minutes) model run. ² EPA default value.	or 300 seconds (5 min	utes) used in the air

Chronic averaged concentrations were calculated using Equation 3. Example 3 shows how this calculation was performed using the total suspended particulates (TSP) concentration at 200 meters as an example. Since TSP is classified as a noncarcinogen, the averaging time (AT) is the same as the exposure duration.

$$C_{chronic} = \frac{CONC \cdot 10^6 \cdot ET_{ctg} \cdot EF_{ctg} \cdot ED}{525,600 \cdot AT}$$
 Equation 3

Where:

 $C_{chronic}$ = average chronic concentration (µg/m³)

CONC = average modeled concentration for one cartridge (g/m³)

 10^6 = unit conversion (µg/g)

 ET_{ctg} = exposure time per cartridge (minutes/cartridge)

EF_{ctg} = exposure frequency (cartridges/year)

ED = exposure duration (years)

525,600 = unit conversion (minutes/year)

AT = averaging time (years)

= averaging time (years)
(carcinogenic endpoint: AT = 70 years
noncarcinogenic endpoint: AT = ED)

Example 3 Sample Calculation Using Equation 3:

$$C_{chronic(TSP)} = \frac{(9.615 \text{E} - 07)(10^6)(5)(123,600)(30)}{(525,600)(30)}$$

 $= 1.13E+00 \mu g/m^3$

Appendix B provides the average modeled concentration for one cartridge (CONC). Table 5 includes the exposure parameters.

Unlike the chronic assessment, only limited guidance for evaluating acute exposures is currently available. Since many cartridges may be fired in a short period of time, however, acute exposures cannot be overlooked. For the purpose of this assessment, acute exposure is defined as a 1-hour or 15-minute exposure. The 1-hour or 15-minute acute exposure averaging times allow for comparison with guidelines developed specifically for emergency planning purposes (see discussion on acute toxicity below).

The exposure frequency is based on the number of cartridges used per 1-hour or 15 minutes depending on the guideline used for comparison. This information is based on the use scenario provided in Table 4. To estimate air concentrations for potential acute health effects, it was conservatively assumed that 3,000 M1A1s are fired in one hour. The average acute concentrations were computed using Equation 4. Example 4 contains a sample calculation at 200 meters using this equation. Since TSP does not have an ATV, aluminum (AI) is used as the example substance.

$$C_{acute} = \frac{CONC \cdot 10^6 \cdot ET_{clg} \cdot EF_{clg}}{60}$$
 Equation 4

Where:

 C_{acute} = average acute concentration ($\mu g/m^3$)

CONC = average modeled concentration for one cartridge (g/m³)

 10^6 = unit conversion (µg/g)

ET_{ctg} = exposure time per cartridge (minutes/cartridge)

EF_{ctg} = exposure frequency (cartridges/hour)*

= unit conversion (minutes/hour)

^{*} Based on 1-hour or 15 minute (0.25 hour) ATV

Example 4 Sample Calculation Using Equation 4:

$$C_{acute(Al)} = \frac{(2.016E - 08)(10^6)(5)(3,000 / 0.25)}{60}$$
$$= 2.02E + 01 \,\mu\text{g/m}^3$$

Appendix B provides the average modeled concentration for one cartridge (CONC) for Al.

6.3 TOXICITY ASSESSMENT

The potential for health effects was determined by comparing time-averaged air concentrations to HBSLs, which are developed from a substance's known toxicity. These toxicity values typically include different levels of safety factors depending on the level of confidence of the critical study. Appendix C contains a table of screening toxicity values used for the chronic and acute assessments.

6.3.1 CHRONIC ASSESSMENT

The chronic assessment was conducted using a screening approach. Using this method, a substance's estimated time-averaged air concentration was compared to its HBSL. If this ratio was less than one, no further analysis was required. This approach is conservative because the exposure assumptions used by the EPA, to establish HBSLs, assume that the resident is continuously exposed for 350 days per year (assuming 2 weeks vacation per year). In contrast, exposure to air emissions from actual training activities at a firing range is intermittent and is not likely to occur on a daily basis year round.

A hierarchy of sources was developed for selection of the HBSLs to quantitatively evaluate as many of the identified substances as possible. The hierarchy of sources used was as follows:

- Clean Air Act, EPA National Ambient Air Quality Standards (NAAQS) (Reference 10)
- > EPA Region 9 Preliminary Remediation Goals (PRGs) (Reference 9)
- ➤ EPA Region 3 Risk-Based Concentrations (RBCs) (Reference 8)

Some substances have neither PRGs nor RBCs because they have their own set of regulatory standards. Under the Clean Air Act, the EPA is required to establish NAAQS for several substances considered harmful to public health and the environment. Currently, NAAQS are available for seven substances. The NAAQS for the longer averaging time were used for the chronic assessment. Depending on the substance, this can range from an 8-hour average to an annual average. In addition,

since the majority of the measured TSP was PM_{10} (particulate matter under 10 microns in size) (Reference 3), the NAAQS for PM_{10} was used to evaluate the potential for health effects from exposure to TSP.

Next on the hierarchy, after the NAAQS, are the EPA Region 9 PRGs and the EPA Region 3 RBCs. Since the methodology used by EPA Region 9 to develop the PRGs generally results in lower values than the EPA Region 3 RBCs, the PRGs were first on the hierarchy of sources. RBCs were used when a PRG was not available. To ensure that the most recent information was used, the Internet sites of both EPA Regions were checked. The HBSLs used for this assessment are presented in Appendix C.

Although the general approach used by both EPA Region 3 and Region 9 is the same, the exposure assumptions differ enough so that final recommended values can vary to a certain degree. In both methods, a substance's screening concentration was selected using the toxicity endpoint that derives a lower concentration. For example, if a substance has a known systemic toxicity and is a carcinogen, the screening concentration was calculated using both toxicity values. To maintain a conservative approach, EPA then selected the lower screening concentration as the recommended PRG or RBC.

Example 5 shows a sample calculation of how a substance's estimated chronic concentration was compared to its HBSL using the TSP concentration at 200 meters as an example.

Example 5

Sample Calculation Comparing a Substance's Estimated Chronic Concentration to Its HBSL:

$$\frac{C_{chronic(TSP)}}{HBSL} = \frac{1.13E + 00}{5.00E + 01}$$
$$= 2.26E - 02 < 1$$

In this case, the resulting ratio is less than one, indicating further evaluation is not necessary.

Many petroleum hydrocarbons were detected but do not have specific screening levels. Therefore, the approach recommended by the Total Petroleum Hydrocarbon Criteria Working Group (Reference 11) was adopted to evaluate petroleum hydrocarbon mixtures. Based on the working group's assessment of various hydrocarbons, it was recommended that mixtures be separated according to a

substance's number of carbons and its chemical class (i.e., aliphatic or aromatic1). Generally, as a substance's carbon number increases, its molecular weight increases, and it is, therefore, not a substance of concern via inhalation. The working group also concluded that aromatic hydrocarbons tend to be more toxic than aliphatic hydrocarbons (Reference 11). Table 6 tabulates the inhalation toxicity values used to evaluate exposure to petroleum mixtures. To be consistent with the methodology used in this assessment, the reference concentrations (RfCs) were converted to PRGs using Region 9 exposure assumptions. The resulting PRGs were used as the HBSLs for the petroleum hydrocarbons in this assessment. These values are presented in Appendix D.

TABLE 6: SUMMARY OF RfCs USED FOR PETROLEUM HYDROCARBONS1

Carbon Range	Aromatic Inhalation RfC (mg/m³)	Aliphatic Inhalation RfC (mg/m³)
C ₅ – C ₆ C _{>6} – C ₈		18.4
C _{>7} – C ₈	0.4	
$C_{>8} - C_{10}$ $C_{>10} - C_{12}$ $C_{>12} - C_{16}$	0.2	1.0
$C_{>16} - C_{21}$ $C_{>21} - C_{35}$	NA	NA

Reference 12

NA = not applicable for high molecular weight TPHs (Total Petroleum Hydrocarbons) (C>16) because substances in this carbon range are not volatile and therefore, inhalation is not a pathway of concern.

6.3.2 ACUTE ASSESSMENT

An established method for assessing acute health effects is not currently available. In 1995 the EPA recognized the need for acute exposure guidelines for emergency response purposes and created the National Advisory Committee for Acute Exposure Guideline Levels (AEGLs) for Hazardous Substances. Currently, AEGLs are available for only a few substances.

To overcome the absence of acute toxicity data, several state regulatory agencies have suggested that guidelines developed for emergency purposes be used in the interim. Although suggestions have been made to use occupational exposure limits (OELs) by applying additional safety factors (References 13, 14), OELs were not used in this assessment because they introduce even more uncertainty than the use of emergency guidelines. The OELs are designed to protect the workplace environment,

¹ Aliphatic hydrocarbons are hydrocarbons in which the carbon atoms are joined by single covalent bonds consisting of two shared electrons (e.g., butane). Aromatic hydrocarbons have ring structures (e.g., benzene) (Reference 12).

and assume 8 hours a day, 5 days a week exposures. By definition, these exposures are more chronic than acute.

In comparison, emergency planning guidelines are more appropriate because they are typically developed for exposures of 1-hour or less. In addition, safety factors are included as part of the guideline development so that the values would be protective of the general population.

Emergency Response Planning Guidelines (ERPGs) published by the American Industrial Hygiene Association (AIHA) (Reference 15) and the Temporary Emergency Exposure Limits (TEELs) developed by the U.S. Department of Energy (DOE) (Reference 16) were used for this assessment, specifically the ERPG-1s and the TEEL-1s. Since TEEL-1s are intended for exposures up to 15-minutes, air concentrations compared to TEELs were averaged over a 15-minute period. Air concentrations compared to ERPGs and AEGLs were averaged over 1-hour, as these values are intended for 1-hour exposures.

For this assessment, the hierarchy of sources for ATV selection was as follows with each ATV defined below:

- ➤ EPA AEGL-1. "AEGL-1 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic, nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure."
- ➤ AIHA ERPG-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed for up to one hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."
- ➤ DOE TEEL-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."

AEGLs were used first when available since they are developed specifically for the purpose of acute exposure assessments. The ERPGs were selected next, prior to a substance's TEEL, because they are vigorously reviewed before they are published whereas the TEELs are not.

Example 6 shows a sample calculation of how a substance's estimated acute concentration was compared to its ATV using the aluminum concentration at 200 meters as an example.

Example 6

Sample Calculation of Comparing a Substance's Estimated Acute Concentration to Its ATV:

$$\frac{C_{acute(AI)}}{ATV} = \frac{2.02E + 01}{3.00E + 04}$$
$$= 6.72E - 04 < 1$$

In this example with AI, the ratio is less than one, indicating that further analysis is not necessary.

7. RISK CHARACTERIZATION

As previously described, the exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic HBSLs or ATVs. The comparison was made using the ratio of the HBSL or ATV to the estimated concentration. This approach is conservative because the exposure assumptions used by the EPA, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near firing ranges.

If this ratio was less than one, no further evaluation was needed. If the chronic or acute averaged concentrations (C_{chronic} and C_{acute}) were greater than the screening levels, resulting in a ratio greater than one, further evaluation would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather, the potential for such.

The chronic and acute assessments were conducted as outlined in Section 6.3. Appendix D presents results from the M1A1 risk characterization.

7.1 CHRONIC HEALTH RISK

The outcome of the chronic assessment indicated that no chronic health effects are expected from breathing the air emissions from the M1A1 at the 100-meter location. Since all ratios were less than one, further evaluation was not necessary. However, air concentrations were modeled at the 200-meter location for consistency with the acute assessment. The resulting ratios were even lower than for the 100-meter location.

7.2 ACUTE HEALTH RISK

The acute exposure assessment, at the 100-meter downwind hypothetical resident location, indicated that levels of lead from the M1A1 emissions were greater than the screening level. Estimated concentrations were remodeled to a distance 200

meters downwind from the firing location. The results showed that the estimated concentration of lead decreased to a safe level below the ATV. The estimated concentrations for all other substances were further reduced with all ratios below one.

The ratio of estimated lead concentrations to the ATV was 2.02 at the 100-meter location. Lead is a naturally occurring bluish-gray metal found in the earth's crust in small amounts. It is commonly used in the production of lead-acid batteries for automotive and industrial applications. Exposure to lead in the air primarily results from emissions from industrial processes. The main target for lead toxicity is the nervous system. Studies have shown that continual inhalation of lead may cause blood effects (Reference 17).

7.3 FACT SHEET

Appendix E includes a copy of the fact sheet submitted to the AEC. The fact sheet used results from this assessment to address health concerns related to inhalation of M1A1 air emissions.

8. UNCERTAINTY DISCUSSION

The limitations inherent in modeling and the added conservatism of the assessment contribute to the uncertainty of the assessment results. The risk assessment methodology typically includes safety factors that are embedded in the toxicity data to ensure adequate protection of the general population, particularly, susceptible individuals such as the sick, elderly, and children. Table 7 identifies areas of uncertainty associated with this assessment.

TABLE 7: TYPES OF UNCERTAINTY

Issue	Uncertainty	Direction of Effect
	Emissions Modeling	
Modeled versus real- time sampling	The air concentrations in this assessment were modeled. Actual air concentrations taken from the field may be higher or lower.	Varies
Frequency of use for the M1A1	Actual frequency of use for these munitions during training exercises may be different from those stated in this report.	Varies
Hypothetical resident assumed to be located directly downwind	Unless the area around the training facility is populated, the chances that a person living directly downwind is low.	Overestimates
Use of worst-case meteorological conditions	To ensure that this assessment is applicable to most training areas, worst-case meteorological conditions were used in the air model.	Overestimates
	Exposure Assessment	
Estimating time- averaged concentrations	Actual exposure from the M1A1 is intermittent. If one were to plot a person's exposure profile, the plot would consist of a series of spikes. Since current risk assessment methodology does not allow the assessment of the potential for health risks as a function of time, a single concentration, averaged over the exposure duration was used. In this assessment, the exposure durations used were 30 years and 1-hour or 15 minutes.	Varies
Comparing estimated concentration to established screening levels	The Region 3 and Region 9 HBSLs were developed assuming that the resident is exposed 350 days per year. It is unlikely for training with the M1A1 to occur for 350 days per year at a particular firing range.	Overestimates
Comparing estimated concentrations to established screening levels	Comparison to screening levels does not account for possible cumulative effects of exposure to more than one substance.	Underestimates

TABLE 7: TYPES OF UNCERTAINTY

Issue	Uncertainty	Direction of Effect
Screening assessment versus calculating an average daily intake	Calculating an average daily intake allows the use of scenario-specific assumptions. However, unless the ratio of concentration to screening level approaches one, a screening assessment is useful as a first-cut evaluation.	Varies
Exposure to other munitions	Other munitions are typically used during the same training exercise. These items may contain similar or different substances from those detected in the M1A1.	Underestimates
	Toxicity Assessment	
Lack of toxicity data	Some substances were not quantitatively evaluated because they have no known toxicity data.	Underestimates
Modifying and uncertainty factors for toxicity data	Modifying factors and uncertainty factors of varying degree are typically applied to toxicological values. These factors are used to conservatively account for extrapolating from animal studies for human health assessment, and to conservatively account for variation in human populations.	Overestimates

9. CONCLUSION

Using conservative assumptions, the assessment indicated that residents who live as close as 200 meters directly downwind from the M1A1 firing location are safe from breathing air emissions from the M1A1. It is believed that the assumptions contained in this analysis are conservative enough to be protective of all the population including the sick, elderly, and children.

10. RECOMMENDATIONS

At installations where offsite residents are located less than 200-meters from the M1A1 firing location, a more site-specific evaluation is recommended. However, it should be noted that at most training installations, training areas are located over 1,000 meters (over half a mile) away from populated areas.

The results from this assessment are intended for a hypothetical training facility, and actual results may vary depending on site-specific conditions. This study used conservative assumptions (e.g., worst-case meteorological conditions, receptor located directly downwind, etc.) and it is believed that most site-specific analyses would result in even lower concentrations. Therefore, the results from this assessment should be applicable to most training facilities, unless site-specific conditions vary significantly.

11. POINT OF CONTACT

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APPENDIX B AIR DISPERSION MODELING OUTPUT DATA

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

Compound Compound Compound Commonia (NH3) Carbon Dioxide (CO2) Carbon Monoxide (CO)	Net Explos Average Measured Actual Concentration (mg/m³)	Number of Items (ested => Net Explosive Weight - N.E.W. (Ibs.) => ATC Finhs Tast Beauties	ns tested => .W. (lbs.) =>	6,37E-03	release duration (t):	2	spuoses
3	Net Explos Average Measured Actual Concentration (mg/m³)	ATC Firms Tast	.W. (lbs.) =>	6,37E-03	Hall Ohnandation 1110).	The second secon	
3	Average Measured Actual Concentration (mg/m³)	ATC Firm Tast			Concentration (CC):	1.636E-04	1.836E-04 g/m 7(g/s)
2	Average Measured Actual Concentration (mg/m³)	teas Right tall	Results	1 343			
2	Actual Concentration (mg/m³)	Dally	Average	Average	Total Mass	Substance	Substance
D	Concentration (mg/m³)	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	(mg/m³)	Concentration	Factor (FE)	Factor	בישונופּס		Rate
Pormanent Gases Ammonia (NH3) Carbon Dioxide (CO2) Carbon Monoxide (CO)		(mg/m³)	(lb/ltem)	(Ib/lb NEW)	(grams/ntem)	(grams/m²)	(g/item)/sec
Ammonia (NH3) Carbon Dioxide (CO2) Carbon Monoxide (CO)							
Carbon Dioxide (CO2)	3.50E+00	NA	1.03E-05	1.62E-03	4 6835-03	3 821 07	00 2405
Carbon Monoxide (CO)	7.16E+02	NA	2.11E-03	3,31E-01	9.574F-01	7.831E-0/	4 707F 04
	6.16E+02	NA	1.82E-03	2.85E-01	8.248E-01	6 747F-05	4,707E-U1
Oxides of Nitrogen (NOx)		NA	1.80E-05	2.82E-03	8.147E-03	6.664F-07	4 073E 03
Sulfur Dioxide (SO2)	2.62E-01	NA	7.73E-07	1,21E-04	3.506E-04	2 868F-08	1 753E-04
Acid Gases							10000
Hydrogen Fluoride	2.30E-01	2.20E-01	QN	S	ND	CN	CN
riyarogen Chloride	2.25E-01	2.10E-01	QN	Q	QN	S	
Hydrogen Bromide	2.20E-01	2.10E-01	Q	ON.	QN	GN CN	
Nitric Acid	2.20E-01	2.10E-01	QN	2	QN	QN	Q V
Phosphoric Acid	2.20E-01	2.10E-01	Q	S	CN	G N	2 2
Sulfuric Acid	9.95E-01	2.10E-01	4.92E-06	7.72E-04	2 232 E.03	1 8265 07	A 440F OO
Cyanide						10201	1.110E-U3
Particulate Cyanide	1.25E-02	1,20E-02	S	S	ON ON		
Hydrogen Cyanide	3.50E-01	2.50E-02	1.17F-06	1 84E.04	A 20EE 04	ON COLOR	QN
Particulates	The state of the s				#0-30000	4.34015-08	2.653E-04
	2.77E+01	NA	9.26E-05	1.45E-02	4.199E-02	3 434E 08	2000
	3.13E+01	NA	1.04E-04	1.64E-02	4.737E-02	3.454E-00	2.099E-02
Particulate Matter <2.5 microns	2.81E+01	AN	9.38E-05	1.47E-02	4.257E-02	3.482E.06	2 420E 02
Metals						0.1000	4.140E-02
Aluminum	5.81E-01	4.34E-02	1.94E-06	3.05E-04	8.805E-04	7 203E.08	A 403E 04
Antimony	3.18E+00	9.88E-01	7.67E-06	1.20E-03	3.480F-03	2 RARE-07	1 7405E-04
Arsenic	1.04E-02	1.09E-02	S	Q	GN	ND CN	1.7+0E-03
Barium	1.36E+00	4.34E-02	4.54E-06	7.13E-04	2.061E-03	1 686F_07	1 020E 02
Beryllium	4.15E-02	4.34E-02	QN.	SN.	ND	ND	NID OIL
Cadmium	4.15E-02	4.34E-02	S	S	QN		
Calcium	2.87E-01	1.99E-01	3,73E-07	5.85E-05	1 690F-04	1 387E 00	O AEOF: OF

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	Cartric	Cartidge, .50 callber, Blank, M1A1 (M2)	llank, M1A1		No. of rounds (I)		1 round
	N	Number of Rems tested =>	ms lested =>		release duration (t):	2	2 seconds
	oldx:: lan	Net Explosive Weight - N.E.W. (lbs.) =>	,W. (lbs.) =>	8.37E-03	Unit Concentration (UC):	1.636E-04	(d/m //(d/s)
		ATC Firing Test Results	Results.				
	Average	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
		Background	Emission	Emission	Emitted		Rate
Service Servic	Concentration	Concentration	Factor (EF)	Factor	(grams/ilem)	(Grams/m³)	(afflem)/eac
	(mg/m³)	(ing/in³)	(lb/item)	(Ib/Ib NEW)		CONC	ER,
Criromium	4.15E-02	4.34E-02	QN	QN	QN	ON	
Cobait		4.34E-02	QN	QN	QN	S	Q Q
Copper	4.13E-01	9.30E-02	1.11E-06	1.74E-04	5.017E-04	4 10AE.08	ND 2 600E 04
Lead	3.73E+00	5.95E-02	1.22E-05	1.92E-03	5.554E-03	4 5435-07	2.309E-04
Wagnesium	4.15E-02	4.34E-02	QN.	S	GN	NIN NIN	Z.///E-U3
Wanganese	4.15E-02	4.34E-02	S	GN	UN	ND ND	
Nickel .	4.15E-02	4.34E-02	QN	CN	ND	GN	QN.
Selenium	1.04E-02	1.09E-02	Q	S		ON S	QN
Silver	4.15E-02	4.34E-02	S	S	ON	2	Q
Thallium	4.15E-02	4,34E-02	2	Q N		2	Q
Vanadium	4,15E-02	4.34F-02	S			Q.	QN
Zinc	1 48F-01	4 34E.03	ON P	ND 1744	ON	QN	g
TO-11 Carbonyls		4.041-02	4.84E-U/	/./aE-U5	2.240E-04	1.832E-08	1.120E-04
Formaldehyde	2 4RE_02	1 995 04	4010				
Acetaldehyde	1 ROF-04	10-22-01	8.19E-08	1.29E-05	3.715E-05	3.039E-09	1.857E-05
Acetone	1 19E-01	1.00E-U1	ON	Q :	QN	ON	QN
Acrolein	2 20E 04	1. 19E+00		Q.	ND	QN	QN
Proprionaldehyde	2 375-01	2.28E-01		QN .	ND	QN	QN
Crotonaldehyde	2 87E.01	2 97E 04	2 2	2	QN	QN	S
Bufyraldehyde	2 05E_01	2.0/E-U!	2 2	QN :	QN	QN	QN
Benzaldehyda	4.30E-01	4.90E-01	2	2	ND	S	QN
Sovaleraldehyde	4.34E-UI	4.34E-01	QN	Q.	QN	QN	QN
Valeraldelivde	3.32E-01	3.52E-01	Q	Q N	QN	QN	S
o m.n. Tolisaldehyda	3.32E-01	3.5ZE-01	Q.	2	QN		QN
Hexaldahyda	4.91E-01	4.91E-01	Q	Q.	ND	GN	QN
2 5. Dimothylhonzoldobudo	4.10E-01	4,10E-01	S	S	QN	QN	GN
VOCA	4. IOE-01	4.10E-01	QN	Q	ND	ON	QN
Pronona	33 447						
212000	9.47E-03	1.72E-03	3.16E-08	0	1.433E-05	1.172F-09	7 188E 08
				T	7		11145-03

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	2005	Carmage, .vo camber, Blank, M1A1 (M2)	D FY IM 'WIR	VIG.)	No. of rounds (I)		Lonud
		Number of Items tested =>	ns tested =>	11	release duration (t):	7	2 seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	W, (lbs.) =>	6.37E-03	Unit Concentration (UC):	1.636E-04	1.636E-04 g/m³/(g/s)
		ATC Firing Test Results	Results				
	Average	Daily	Average	Average	Total Mass	Substance	Suhelanco
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission	Emitted		Rate
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/Item)	(grams/m³)	(d/llem)/sec
	(mg/m³)	(mg/m²)	(Ib/Itam)	(Ib/lb NEW)		CONC	ER.
Dichlorodiflouromethane	2.97E-03	2.97E-03	1.14E-09	1.79E-07	5.167E-07	4.227F11	2 584E-07
Chlorodifluoromethane	3.54E-03	3.54E-03	QN	DN	ON	CN	S LON
Freon 114	6.99E-03	6,99E-03	QN	Q	QN	QN.	CN
Chloromethane	1.55E-03	2.07E-03	5.14E-09	8.07E-07	2.331E-06	1.907E-10	1.166F-06
Vinyl Chloride	2.56E-03	2.56E-03	QN	9	ND	QN	GN
1,3-Butadiene	2.21E-03	2.21E-03	QN	S	ON	QN	GN
Bromomethane	3.88E-03	3.88E-03	QN	QN	ON	QN	GN
Chloroethane	2.64E-03	2.64E-03	QN	QN	QN	QN	S
Dichlorofluoromethane	4.21E-03	4,21E-03	QN	S	QN	QN	S
Trichloroflouromethane	1.69E-03	1.69E-03	6.47E-10	1.02E-07	2.935E-07	2.401E-11	1.468E-07
Pentane	2.95E-03	2.95E-03	ND	QN.	QN	QN	GN CN
Acrolein	1.03E-02	2,29E-03	3.44E-08	5.41E-06	1.563E-05	1,278E-09	7.813F-06
1,1-Dichlorethene	4.05E-03	4.05E-03	QN	S	QN	ON	S
Freon 113	7.68E-03	7.68E-03	QN	QN	ON	N ON	Q
Acetone	1.86E-01	6.89E-02	4.16E-07	6.53E-05	1.888E-04	1.544E-08	9.438E-05
Methyl lodide	5.81E-03	5.81E-03	DN	ND	NO	ON	Q
Carbon Disulfide	3.11E-03	3.11E-03	ΩN	QN	ND	QN	2
Acetonitrile	5.88E-03	1.68E-03	1.96E-08	3,07E-06	8.869E-06	7.255E-10	4.434E-06
3-Unioropropene	3.13E-03	3.13E-03	9	Q	QN	ON	QN
Metriylene Omonde	8.16E-02	2.78E-02	1.89E-07	2.97E-05	8.587E-05	7.024E-09	4.293E-05
tert-butyl Atconol	3.03E-03	3.03E-03	9	QN	ON	ON	S
Aciyionitrile	2.06E-03	2.17E-03	6.88E-09	1.08E-06	3.120E-06	2.552E-10	1.560E-06
trans-1,2-Dichloroethene	3.96E-03	3.96E-03	Q	ND	QN	QN	Q.
Wetnyl t-Butyl Ether	3.61E-03	3.61E-03	Q	ON	QN	QN	QN
Hexane	1.27E-01	5.64E-02	2.55E-07	4.01E-05	1.158E-04	9,476E-09	5.792E-05
1,1-Dichloroethane	3.97E-03	3.97E-03	QN	Q	QN	ND	QN.
Vinyl Acetate	3.52E-03	3.52E-03	QN	ND	QN	ON	<u>Q</u>
cis-1,2-Dichloroethene	3.96E-03	3.96E-03	S	QN	QN	S	CN

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	Cartrio	Cartridge, .50 caliber, Blank, M1A1 (M2)	länk, M1A1 (No. of rounds (I)		round
		Car Delign of Hems (ested as	ms (ested =>		release duration (t):	7	2 seconds
	SOIDE LADIOS	ivel Explosive vveignt - N.E.W. (lbs.) =>	w. (lbs.) ≈>	6.37E-03	Unit Concentration (UC):	1.836E-04	1.836E-04 g/m³/(g/s)
		AIC FIND Test Results	Results				
	Average	Dally	Average	Average	Total Mass	Substance	Suhelanna
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Finiscion
	Actual	Background	Emission	Emission	Emilled		Data
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(arams/m³)	Callounicas
	(mg/m²)	(mg/m²)	(Ib/item)	(Ib/Ib NEW)		CONC	(g/ucinjisec
Z-Butanone	2.95E-03	2.95E-03	Q	CN	GN	CIN	
Ethyl Acetate	3.60E-03	3.60E-03	S	CN		ON COL	ON
Methyl Acrylate	3.52E-03	3.52E-03	SN	QN CN	ON ND	NO	QN
Chloroform	4.88E-03	4.88F-03	S	C N	ON CANA	Q .	Q
1,1,1-Trichloroethane	1.36E-03	2.18E-03	CN		·	QN	QN
Carbon Tetrachloride	6.29E-03	6.29F-03	2 2	2 5	ON	S	QN
1,2-Dichlorethane	4.05E-03	4 05F-03			ON	Q	Q
Benzene	7.03E-02	6.395.04	2 33E 07	10	ON C	Q	ND
Isooctane	4 67F-03	A R7E 03	6.33E-07	3.03E-U3	1.055E-04	8.630E-09	5.275E-05
Heptane	4.10F-03	4 10E 02		QN	QN	ON	QN
Trichloroethane	A 88E 02	4 90F 05	ON S	Q .	QN	Q	QN
Ethyl Acrylate	4.00E-03	4.88E-03	2	QN	QN	2	QN
1 2. Dichloropropos	4.08E-03	4.09E-03	Q	Q	QN	S	CN
Methyl Methocylota	4.62E-03	4.62E-03	Q N	ON	QN	QN	CN
Dibromomethane	4.09E-03	4.09E-03	QN	ON	QN	QN	QN
1.4-Dinxane	0 001 00	7.11E-03	Q	QN N	QN	S	QN
Bromodichloromothana	3.00E-03	3.60E-03	QN	Q.	ND	Q.	QN
4-Methyl-2-Pentanone	0.70E-03	6.70E-03	<u>Q</u>	Q	QN	S	2
Tolliene	4. IUE-U3	4.10E-03	QN	2	QN	Q	QN
Oclane	3.77E-U3	3.77E-03	1.26E-08	1.97E-06	5.699E-06	4.662E-10	2.850E-06
franc. 1 3-Dichloronrong	4.07 E-03	4.6/E-03	Q	Q	QN	QN	GN
Ethyl Mathacrulata	4.54E-03	4.54E-03	9	QN	QN	ON ON	CN
1 1 2. Trichloroethan	4.6/E-03	4.67E-03	Q	QN	QN	S	
Tertrachloroethone	5.46E-U3	5.46E-03	Q	QN	QN	GN CN	S
		6.78E-03	S	QN	ND	CN	2 2
Dibromodia	4.10E-03	4.10E-03	ON	QN	QN	S	
1 2 Dibramodhana	8.52E-03	8.52E-03	S	QN	- QN		
1,z-Diolonioelliane	7.68E-03	7.68E-03	ON	QN	QN	S	2 2
Cilioropenzene	4.60E-03	4.60E-03	Q	QN	CN		ON S
				T	2.	 	N.

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

Compound Concompound Con	Number of Items tested => Net Explosive Weight - N.E.W. (lbs.) => ATC Firing Test Results* Perage Dally Average nasured Measured Adjusted ctual Background Emission sentration Concentration Factor (EF) ng/m³) (ing/m³) (ib/item) 37E-03 6.87E-03 ND 34E-03 4.34E-03 ND 36E-03 4.26E-03 8.60E-09 33E-02 1.03E-02 ND	Results Average Adjusted Emission Factor (EF) (Ib/Item) ND	Average Adjusted Emission Factor (bulb NEW) ND ND ND 1.38E-06 ND	Unit Concentration (UC): Total Mass of Substance Emitted (grams/item) ND ND ND ND ND ND ND	1,636E-04	2 seconds 1.636E-04 g/m³/(g/s)
Compound Concount	ATC Firing Test ATC Firing Test Dally Messured Background Concentration (mg/m³) 6.87E-03 4.34E-03 4.34E-03 4.26E-03 1.03E-02	Results Results Average Adjusted Emission Factor (EF) (b/Item) ND		Unit Concentration (UC): Total Mass of Substance Emitted (grams/item) ND ND ND ND 3.975E-06	1.636E-04	(6/6)/ _, m/6
Average Actual Actual Actual Compound Average Actual Actual Concentration (mg/m³) etrachloroethane 6.87E-03 rene 4.34E-03 rene 2.61E-03 rene 4.34E-03 rene 2.61E-03 rene 4.34E-03 rene 2.61E-03 rene 4.34E-03 rene 4.34E-03 renchlorethane 6.03E-03 retrachlorethane 6.03E-03 retrachlorethane 6.03E-03 rethylbenzene 6.01E-03 rethylbenzene 6.01E-03 rethylbenzene 6.01E-03 rethorobenzene 6.01E-03 rethane 6.01E-03 rethane 6.01E-03 rethane 7.42E-03	ATC Firing Test Dally Measured Background Concentration (mg/m³) 6.87E-03 4.34E-03 4.34E-03 4.26E-03 1.03E-02	Average Adjusted Emission Factor (EF) (Ib/Item) ND ND ND 8.76E-09 ND		Total Mass of Substance Emitted (grams/item) ND ND ND 3.975E-06		
Average Neasured Actual Actual Actual Concentration (mg/m³) Actual Actual Actual (mg/m³) etrachloroethane 6.87E-03 zene 4.34E-03 rine 2.61E-03 rine 4.34E-03 rine 2.61E-03 rine 4.34E-03 rine 2.66E-03 rine 4.92E-03 chloropropane 6.03E-03 chloropropane 6.03E-03 riluene 4.92E-03 methylbenzene 6.01E-03 riluene 4.92E-03 methylbenzene 6.01E-03 clorobenzene 6.01E-03 chrorobenzene 6.01E-03 driedenzene 6.01E-03	Dally Measured Background Concentration (mg/m³) 6.87E-03 4.34E-03 4.34E-03 4.34E-03 1.03E-02	Average Adjusted Emission Factor (EF) (Ib/Item) ND ND ND ND 8.76E-09 ND ND ND ND ND ND ND	Average Adjusted Emission Factor (Ib/Ib NEW) ND ND ND 1.38E-06 ND 1.35E-06 ND ND	Total Mass of Substance Emitted (grams/item) ND ND ND ND ND ND ND ND ND		
Compound Concentration Compound Concentration etrachloroethane 6.87E-03 zene 4.34E-03 rine 2.61E-03 rine 2.61E-03 rine 4.34E-03 rine 2.61E-03 rine 4.34E-03 chloropropane 6.03E-03 chloropropane 6.03E-03 anterhylbenzene 6.04E-03 rine 4.92E-03 rinethylbenzene 6.01E-03 rincobenzene 6.01E-03 chrobenzene 6.01E-03 chrobenzene 6.01E-03 chloride 6.01E-03 chrobenzene 6.01E-03 chrobenzene 6.01E-03 chrobenzene 6.01E-03 rintethylbenzene 6.01E-03 rintethylbenzene 6.01E-03 gorobenzene 6.01E-03 gorobutadiene 7.42E-03 rintethylbenzene 6.01E-03 gorobutadiene 7.42E-03 rintethylbenzene 6.	Measured Background Concentration (mg/m³) 6.87E-03 4.34E-03 4.34E-03 4.34E-03 1.03E-02	Adjusted Emission (EF) (Ib/Item) ND	Adjusted Emission Factor (bulb NEW) ND ND ND 1.38E-06 ND	of Substance Emitted (grams/item) ND ND ND ND 3.975E-06	Substance	Substance
Compound Concentration ctrachloroethane 6.87E-03 zene 4.34E-03 rie 2.61E-03 rie 2.61E-03 rie 2.61E-03 rie 2.61E-03 rim 1.03E-02 rin 4.34E-03 ctrachlorethane 6.87E-03 chloropropane 6.03E-03 riluene 4.92E-03 methylbenzene 6.04E-03 ethyl Styrene 4.92E-03 methylbenzene 6.01E-03 orrobenzene 6.01E-03 chrobenzene 6.01E-03 chrobenzene 6.01E-03 chrobenzene 6.01E-03 orrobenzene 6.01E-03 orrobutadiene 7.42E-03 orrobutadiene 1.07E-03 utatively Identified Compounds (TICs) utatively Identified Compounds (TICs)	Background Concentration (mg/m³) 6.87E-03 4.34E-03 4.34E-03 4.34E-03 1.03E-02	Emission (b/item) (b/item) ND ND 8.76E-09 ND 8.60E-09	Factor Factor ND ND ND 1.38E-06 ND	Emilted (gráms/item) ND ND ND 3.975E-06	Concentration	Emission
Compound Concentration (mg/m³) etrachloroethane 6.87E-03 zene 4.34E-03 zene 4.34E-03 rine 2.61E-03 rine 2.61E-03 rine 2.61E-03 rine 4.34E-03 rine 4.34E-03 rine 4.34E-03 rine 4.92E-03 rincene 6.03E-03 rincene 6.03E-03 rincene 4.92E-03 methylbenzene 4.92E-03 rincobenzene 6.01E-03 orrobenzene 6.01E-03 orrobenzene 6.01E-03 orrobenzene 6.01E-03 orrobenzene 6.01E-03 orrobutadiene 7.42E-03 orbutadiene 1.07E-03 ribons 1.96E-03	Concentration (mg/m³) 6.87E-03 4.34E-03 4.26E-03 1.03E-02	Factor (EF) (Ib/Item) ND ND ND 8.76E-09 8.60E-09 ND	Factor (Ib/Ib NEW) ND ND 1.38E-06 ND 1.35E-06 ND ND ND ND	(grams/item) ND ND ND 3.975E-06		Rate
tetrachloroethane 6.87E-03 zene 4.34E-03 zene 4.34E-03 retrachloroethane 2.61E-03 rm 4.34E-03 rm 4.34E-03 z.56E-03 2.56E-03 retrachlorethane 6.87E-03 chloropropane 6.03E-03 methylbenzene 6.03E-03 ethyl Siyrene 4.92E-03 methylbenzene 6.01E-03 forobenzene 6.01E-03 forobenzene 6.01E-03 forobenzene 6.01E-03 forobenzene 6.01E-03 forobutadiene 7.42E-03 orobutadiene 1.07E-02 mtatively identified Compounds (TICs) 1.07E-02 trbons 1.96E+00	(mg/m³) 6.87E-03 4.34E-03 4.34E-03 4.26E-03 1.03E-02	(lb/ltem). ND ND 8.76E-09 8.60E-09 ND ND	(lb/lb NEW) ND ND 1.38E-06 ND ND ND ND ND ND	ND ND 3.975E-06	(grams/m³)	(g/item)/sec
etrachloroethane 6.87E-03 zene 4.34E-03 rie 2.61E-03 rie 2.61E-03 rie 4.34E-03 rie 2.6E-03 rim 4.34E-03 rie 4.34E-03 rie 4.92E-03 etrachlorethane 6.87E-03 chloropropane 6.03E-03 sinzene 4.92E-03 methylbenzene 4.92E-03 lorobenzene 6.01E-03 lorobenzene 6.01E-03 chloride 5.18E-03 chlorobenzene 6.01E-03 chlorobenzene 6.01E-03 orobutadiene 7.42E-03 orobutadiene 1.07E-02 ntatively Identified Compounds (TICs) trbons 1.07E-02 trbons 1.96E+00	6.87E-03 4.34E-03 4.34E-03 4.34E-03 1.03E-03	ND ND 8.76E-09 ND 8.60E-09	ND ND 1.38E-06 1.35E-06 ND ND ND	ND ND 3.975E-06	CONC	Æ
zene 4.34E-03 ne 2.61E-03 re 4.34E-03 rm 4.34E-03 rm 2.56E-03 rm 4.92E-03 etrachlorethane 6.03E-03 chloropropane 6.03E-03 snzene 6.03E-03 nluene 4.92E-03 methylbenzene 4.92E-03 elhyl Slyrene 4.92E-03 methylbenzene 6.01E-03 lorobenzene 6.01E-03 chorobenzene 6.01E-03 chlorobenzene 6.01E-03 chlorobenzene 7.42E-03 chlorobenzene 6.01E-03 chlorobenzene 7.42E-03 orobuttadiene 1.07E-02 ntatively identified Compounds (TICs) trbons 1.96E+00	4.34E-03 4.34E-03 4.34E-03 4.26E-03 1.03E-02	8.76E-09 ND 8.60E-09 ND	1.38E-06 1.38E-06 1.35E-06 ND ND	ND 3.975E-06	QN	CN
trie 2.61E-03 trim 4.34E-03 trim 1.03E-02 trim 1.03E-02 etrachlorethane 6.87E-03 chloropropane 6.03E-03 chloropropane 6.03E-03 intene 4.92E-03 methylbenzene 6.01E-03 forobenzene 6.01E-03 forobenzene 6.01E-03 chlorobenzene 6.01E-03 chlorobenzene 6.01E-03 chlorobenzene 6.01E-03 chlorobenzene 6.01E-03 chlorobenzene 7.42E-03 chlorobenzene 6.01E-03 chlorobenzene 6.01E-03 chlorobenzene 1.07E-02 mattively identified Compounds (71Cs) tribons tribons	4.34E-03 4.34E-03 4.26E-03 1.03E-02	8.76E-09 ND 8.60E-09 ND	1.38E-06 ND 1.35E-06 ND ND	3.975E-06	S	2
tm 4.34E-03 tm 1.03E-02 etrachlorethane 4.92E-03 chloropropane 6.03E-03 chloropropane 6.03E-03 nizene 6.03E-03 methylbenzene 4.92E-03 methylbenzene 4.92E-03 orobenzene 6.01E-03 orobenzene 6.01E-03 orobenzene 6.01E-03 orobenzene 6.01E-03 orobutadiene 1.07E-03 orobutadiene 1.07E-03 rhatively identified Compounds (TICs) rhons 1.07E-03 rhons 1.96E+00	4.34E-03 4.26E-03 1.03E-02	ND 8.60E-09 ND	1.35E-06 ND ND ND		3.252E-10	1.988E-06
rm 2.56E-03 rm 1.03E-02 etrachlorethane 6.87E-03 chloropropane 6.03E-03 illene 4.92E-03 methylbenzene 4.92E-03 ethyl Siyrene 4.92E-03 methylbenzene 4.92E-03 forobenzene 6.01E-03 forobenzene 6.01E-03 forobenzene 6.01E-03 forobenzene 6.01E-03 forobenzene 7.42E-03 forobutadiene 7.42E-03 forobutadiene 7.42E-03 friboritadiene 7.42E-03 forbutadiene 7.42E-03 fribons 7.42E-03 <t< td=""><td>4.26E-03 1.03E-02</td><td>8.60E-09 ND</td><td>1.35E-06 ND ND</td><td>Q.</td><td>QN</td><td>QN</td></t<>	4.26E-03 1.03E-02	8.60E-09 ND	1.35E-06 ND ND	Q.	QN	QN
1.03E-02 4,92E-03 4,92E-03 4,92E-03 9 6,87E-03 9 6,03E-03 9 6,42E-03 10 4,92E-03 10 4,92E-03 10 4,92E-03 10 10 10 10 10 10 10 10 10 10 10 10 10 1	1.03E-02	2	QN QN	3.900E-06	3,190E-10	1.950E-06
4.92E-03 4.92E-03 4.92E-03 4.92E-03 6.97E-03 6.92E-03 4.92E-03 4.92E-03 4.92E-03 4.92E-03 4.92E-03 4.92E-03 6.01E-03 6.01E-03	A 02E 03		QN Q	ON	ND	QN
bropane 6.87E-03 propane 6.03E-03 bropane 6.03E-03 bropane 6.042E-03 brozene 4.92E-03 brozene 4.92E-03 brozene 6.01E-03 brozene 6.01E-03 brozene 6.01E-03 brozene 6.01E-03 adiene 7.42E-03 adiene 1.07E-02 brozene 6.01E-03 brozene 6.01E-03 brozene 6.01E-03 brozene 6.01E-03 brozene 7.42E-03 brozene 7.42E-03 brozene 7.42E-03 brozene 7.42E-03	4.92103	ON	QN	ON	QN	QN
propane 6.03E-03 9 6.42E-03 9 6.42E-03 4.92E-03 Hoenzene 4.92E-03 Nzene 6.01E-03 nzene 6.01E-03 nzene 6.01E-03 nzene 6.01E-03 ne 7.42E-03 adlene 1.07E-02 ely identified Compounds (7/Cs) \$	6.87E-03	QN		QN	QN	QN
6.42E-03 6.42E-03 4.92E-03 4.92E-03	6.03E-03	QN	ON	QN	QN	QN
4.92E-03 4.92E-03	6.42E-03	ND	QN	QN	S	QN
nethylbenzene 4.92E-03 uthyl Styrene 4.83E-03 nethylbenzene 4.92E-03 orobenzene 6.01E-03 orobenzene 6.01E-03 orobenzene 6.01E-03 rethane 9.68E-03 robutadiene 1.07E-02 tatively identified Compounds (TICs) tbons 1.96E+00	4.92E-03	ON	QN	ON	ON	S
tityl Styrene 4.83E-03 nethylbenzene 4.92E-03 orobenzene 6.01E-03 orobenzene 6.01E-03 hloride 5.18E-03 rethane 9.68E-03 ridorobenzene 7.42E-03 ridoutadiene 1.07E-02 tatively identified Compounds (TICs) tbons 1.96E+00	4.92E-03	Q	ON	ND	QN N	9
nethylbenzene 4.92E-03 orobenzene 6.01E-03 orobenzene 6.01E-03 hloride 5.18E-03 orobenzene 6.01E-03 rethane 9.68E-03 nrobutadiene 7.42E-03 ratively identified Compounds (TICs) tbons 1.97E-02 tbons 1.96E+00	4.83E-03	ON	QN	QN	S	QN.
orobenzene 6.01E-03 orobenzene 6.01E-03 hloride 5.18E-03 orobenzene 6.01E-03 rethane 9.68E-03 robutadiene 7.42E-03 ratively identified Compounds (TICs) tbons 1.96E+00	4.92E-03	ON	QN	QN	GN	QN
orobenzene 6.01E-03 hloride 5.18E-03 orobenzene 6.01E-03 irethane 7.42E-03 robutadiene 1.07E-02 ratively Identified Compounds (TICs) thous 1.96E+00	6.01E-03	S	QN	QN	QN	QN
1.96E+03 1.96E+03 1.96E+03 1.96E+03 1.07E+03 1.07E+03 1.07E+02 1.07E+02 1.07E+02 1.07E+02 1.07E+02 1.07E+02 1.00E+00 1.96E+00 1.96E+00	6.01E-03	QN	QN	QN	QN	QN
orobenzene 6.01E-03 rethane 9.68E-03 shlorobenzene 7.42E-03 robutadiene 1.07E-02 tatively identified Compounds (TICs) tbons 1.96E+00	5.18E-03	QN	ON	QN	QN	QN
9.68E-03 shlorobenzene 7.42E-03 robutadiene 1.07E-02 tatively identified Compounds (TICs) tbons 1.96E+00	6.01E-03	QN	QN	ON	QN	QN
riorobenzene 7.42E-03 riobutadiene 1.07E-02 tatively identified Compounds (TICs) tbons 1.96E+00	9.68E-03	S	QN	QN	QN	QN
robutadiene 1.07E-02 tatively Identified Compounds (TICs) thons 1.96E+00	7.42E-03	Q	ON	ON	ON.	QN.
thatively Identified Compounds (TICs) Thoms 1.96E+00	1.07E-02	Q	QN	QN	N N	QN
1.96E+00				And the second s		
1.96E+00			157/A			***
	9.58E-01	3.73E-06	5.85E-04	1.690E-03	1.382E-07	8.448E-04
1.12E-01	2.29E-02	3.72E-07	5.84E-05	1.688E-04	1.381E-08	8.441E-05
ne 5:99E-02	2.13E-02	2.00E-07	3.14E-05	9.073E-05	7.422E-09	4.536E-05
2.46E-02	2.46E-02	QN	QN	ON	QN	QN
	3.44E-02	Q	QN	ON	QN	QN

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	Cartric	Cartridge, 50 callber, Blank, M1A1 (M2)	llank, M1A1 (M2)	No. of rounds (I)		round
		Number of Items tested =>	ms tested =>	i)	release duration (t):	2	
	Net Explos	Explosive Weight - N.E.W. (lbs.) =>	.W. (Ibs.) =>	6.37E.03	Unit Concentration (UC):	1.636E-04	1.636E-04 g/m 3/(a/s)
		ATC Firing Test Results	Results				4 (9)
	Average	Dally	Average	Averen			
	Magaired	Modelican		A STATE OF THE STA		Substance	Substance
新 · · · · · · · · · · · · · · · · · · ·	Actual	Backorolind	Fmission	Emission	OI SUBSTRINCE Emiliara	Concentration	Emission
Compound	Concentration	Concentration	Factor (EF)	Factor			Kale
	(man)	(mg/m)	(Ilb/ff8m)	(Ib/Ib NEW)	(IIII)	(GONC	(g/item)/sec ER.
Propane	3.61E-02	3.61E-02	S	SN C		NIO	
Propyne	3,20E-02	3.20E-02	QN	ON	GN		QN QN
Isobutane	4.75E-02	4.75E-02	GN	QN	QN		
1-Butene/Isobutylene	9.18E-02	9.18E-02	QN	ND	Q		
1,3-Butadiene/butane	4.59E-02	4.59E-02	QN	QN	QN	S	GN CN
cis-butene	4.59E-02	4.59E-02	QN	QN	ON	GN	
1-Butyne	4,59E-02	4.59E-02	QN	QN	QN	S	CIN
trans-Butene	4.59E-02	4.59E-02	QN	S	ON	S	
2-Butyne	4.42E-02	4.42E-02	QN	QN	QN	GN	2 2
n-Pentane	5.90E-02	5.90E-02	Q	2	QN ON	QN CN	
n-Hexane	1.01E-01	7.05E-02	2.85E-07	4.48E-05	1.295E-04	1 059E-08	R AZAE OF
SVOCs STATE OF THE						COOPT OF	0:414E-03
N-nitrosodImethylamine	1.80E-02	1.86E-02	QN	Q	QN		CIN
Bis(2-chloroethyl)ether	1.80E-02	1.86E-02	QN	QN	QN	CN	2 2
Phenol	1.80E-02	1.86E-02	S	S	QN	CN	
Z-cnlorophenol	1.80E-02	1.86E-02	QN	QN	ND	CN	
1,3-dichlorobenzene	1.80E-02	1.86E-02	QN	QN	QN .	QN	S
1,4-dichlorobenzene	1.80E-02	1.86E-02	QN	GN	ND	QN	GN
1,Z-dichlorobenzene Benzul alcahat	1.80E-02	1.86E-02	9	QN	ON	QN	N N
Bis/2 oblorologomowill after	1.80E-02	1.86E-02	QN	Q	ND	QN	QN
2-methylphenel	1.80E-02	1.86E-02	Q	QN	QN	QN	ND
Lovochlorochono	1.80E-02	1.86E-02	2	Q.	QN	S	NO
N Signal of the state of the st	1.80E-02	1.86E-02	Q	ON	QN	- QN	QN
Marini Uso-di-n-propyiamine	1.80E-02	1,86E-02	Q	QN	DN	Q	QN
4-memyiphenol	1.80E-02	1.86E-02	ON	QN	QN	QN	QN
Nitrobenzene	1.80E-02	1.86E-02	ON	QN	QN	2	CN
Isophorone	1.80E-02	1.86E-02	QN	QN	QN	QN	S
Z-nitrophenol	1.80E-02	1.86E-02	QN	S	N ON	CN	QN
		**************************************		T		35	-

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	2000	Carridge, .50 caliber, Blank, M1A1 (M2)	1 71 W 1 1 1 1	116,1	No. of rounds (I)		round
		Number of Items tested =>	ns tested =>		release duration (t):	2	seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	W. (lbs.) =>	6.37E-03	Unit Concentration (UC):	1,636E-04	1,636E-04 g/m 3/(g/s)
	**************************************	ATC Firing Test Results	Results				
	Average	Oally	Average	Average	Total Mass	Substance	Substance
	Measured	Reckmoning	Adjusted	Adjusted	of Substance	Concentration	Emission
Compound	Concentration	Concentration	Earlor (EE)	Factor	Calling		Rate
		(mg/m²)	(lb/item)	(Ib/Ib NEW)	(Maille)	(grams/m ⁻)	(g/lteim)/sec ER,
2,4-dimethylphenol	1.80E-02	1.86E-02	ON.	Q	QΝ	CN	CIV
Bis(2-chloroethoxy)methane	1.80E-02	1.86E-02	QN	QN	QN	CN	
2,4-dichlorophenol	1.80E-02	1.86E-02	QN	QN.	QN QN	CN	
1,2,4-trichlorobenzene	1.80E-02	1,86E-02	QN	ON	ND	CN	S S
Naphthalene	9.31E-03	1.86E-02	3.06E-08	4.80E-06	1.388E-05	1.136E-09	6 941E-08
4-chloroaniline	1.80E-02	1.86E-02	QN	QN	QN	GN	CN
Hexachlorobutadiene	1.80E-02	1.86E-02	QN	QN	QN	QN	CN
4-chloro-3-methylphenol	1.80E-02	1.86E-02	QN	QN	ND	S	QN
2-methylnaphthalene	1.80E-02	1.86E-02	QN	ON	ND	QN.	GN
Hexachlorocyclopentadiene	1.80E-02	1.86E-02	QN	QN	ON	Q	CN
2,4,6-trichlorophenol	1.80E-02	1.86E-02	ON	ON	QN	QN	QN
Z,4,5-trichlorophenol	1.80E-02	1.86E-02	QN	Q.	QN	QN	QN
2-chloronaphthalene	1.80E-02	1.86E-02	QN	QN	QN	QN	GN S
2-nitroaniline	1,80E-02	1.86E-02	QN	QN	QN .	ON	GN
Acenaphthylene	1.80E-02	1.86E-02	ΩN	QN	QN	QN	S
Umetnylphthalate	1.80E-02	1.86E-02	QN	ON	QN	QN	S
Z,b-dinitrotoluene	1.80E-02	1.86E-02	QN	QN	QN	QN	QN
Acenaphthene	1.80E-02	1.86E-02	QN	ON	QN	QN	QN
3-hitroaniline	3.60E-02	3.71E-02	Q	QN	QN	QN	QN
Z,4-dilikiophenoi	3.60E-02	3.71E-02	Q	QN	ON	S	S
Dibelizolulan		1.86E-02	Q	Q	QN	ON	SN
Z,4-uiliiroioiuene	1.80E-02	1.86E-02	Q N	QN	QN	S	QN
4-mirophenol	3.60E-02	3.71E-02	Q	QN	ON	ON	QN
riuorene	1.80E-02	1.86E-02	Ω	QN	ND	QN	QN
4-chlorophenyl-phenylether	1.80E-02	1.86E-02	Q	QN	QN	S	QN
Ulethylphthalate	1.80E-02	1.86E-02	OZ.	QN	QN	QN	ND
4-milioannine	3.60E-02	3.71E-02	Q	Q	ON	QN	QN
4,0-dinitio-z-metnyiphenol	3.60E-02	3.71E-02	Q	QN	ΩN	QN.	ON

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	Cartric	Cartridge, .50 caliber, Blank, M1A1 (M2)	llank, M1A1 (M2)	No. of rounds (I)		4 701 114
		Number of Items tested =>	ms tested =>	1	roloses duration (6).		ni mo
	Net Explos	Net Explosive Weight - N E W 21ha > =>	W (Ihe) =>	1	reicase duranum (i).		2 seconds
		THE THE PARTY OF T	.vv. (ilias.) ==	6.3/E-03	Unit Concentration (UC):	1.636E-04	1.636E-04 g/m³/(g/s)
		AIC FIRING TEST RESULTS	Kesults	-			
	Average	Daily	Average	Average	Total Mass	Stiffeloning	Orthod
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission	Emitted		Date
Compound	Concentration	Concentration	Factor (EF)	Factor	(drams/ilem)	(arame/m ³)	(m/ilpmy/mon
	(mg/m³)	(mg/m³)	(lb/llem)	(Ib/Ib NEW)		CONC	(g/neml/sec
N-nitrosodiphenylamine(1)	1.80E-02	1.86E-02	QN	CN	NO CAN	CIT.	
4-bromophenyl-phenylether	1.80E-02	1.86E-02	CN	QN CN	ON	ON.	QN
Hexachlorobenzene	1.80E-02	1.86E-02	GN	S	ON	ON S	QN N
Pentachlorophenol	3.60E-02	3.71E-02	QN	CN	ON ON		QN
Phenanthrene	1.80E-02	1.86E-02	QN	CN	QN		ON.
Anthracene	1.80E-02	1.86E-02	QN	GN	ON ON	ON O	Q .
Di-n-butylphthalate	1.80E-02	1.86E-02	CN			ND	QN
Fluoranthene	1.80E-02	1.86E-02	CN		ON GA	ON.	Q
Pyrene	1.80E-02	1 86F-02	S		ON	G	QN
Butylbenzylphthalate	1.80F-02	1 RGE-02		2 2	ON	QN	QN
Benzo(a)anthracene	180 €-02	1 8GE 02				QN	QN
Chrysene	1 ROE-02	1 BRE 00		ON S	GN	QN	ON ON
3,3-dichlorobenzidine	1 805.02	1,000,-02	ON S	Q !	ON .	QN	QN
Bis(2-ethylhexyl)nhthalata	2 OFF 04	1.80E-02	Q.	QN	ON	ON.	ON
Di-n-octvlohthalata	3.93E-01	1.79E-01	2	QN	ON	S	GN
Benzo(h)flioranthene	1.00E-02	1.86E-02	Q	Q	ON	QN	GN
Benzo(k)flioranthene	1.00E-02	1.86E-02	QN.	Q	QN	QN	QN
Benzo(a)pyrene	1.00E-02	1.80E-02	Q .	Q.	QN	Q	ON
Indeno(1.2.3-cd)nyrana	1.00L-02	1.00E-UZ	GN	QN N	QN	QN	Q
Dibenz(a.h)anthracene	1.00E-02	1.80E-02	ON !	Q	QN	Q	QN N
Benzo(a h i)nervlene	1,005-02	1.00E-UZ	2	QN	ON	Q	QN
SVOC Tentatively Identified Company	1.00E-02	1.86E-UZ	GN	S	QN	QN	S
TO.12 (DAME)	SOULS INCS						
Namthologo							1 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Aconomistic	6.39E-03	2.60E-03	1.36E-08	2.14E-06	6.178E-06	5.053F-10	3 ORGE OR
Acenaphinylene	1.60E-04	1.86E-05	5.36E-10	8.42E-08	2.433E-07	1 990F-11	1 24RE 07
Acenaphinene	3.87E-05	2.23E-05	6.32E-11	9.92E-09	2.867E-08	2 345E-12	1.2.10L-01
riuorene	4.93E-05	1.86E-05	1.65E-10	2.59E-08	7.476E-08	R 11KE 19	3 739F 00
Phenanthrene	8.79E-05	5.19E-05	1.40E-10	2 20F-08	€ 371E 00	21.135.12	3.7.30E-U8
				#:For 00	00-01 /00	5.211E-12	3.185E-08

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	Cartrid	Cartridge, .50 caliber, Blank, M1A1 (M2)	lank, M1A1 (W2)	No. of rounds (I)		1 round
		Number of items tested =>	ns tested =>	11	release duration (t):	2	2 seconda
	Not Explos	Not Explosive Weight - N.E.W. (ibs.) =>	W. (lbs.) =>	8,37E-03	Unit Concentration (UC):	1.638E-04	1.638E.04 a(m³/(a/s)
		ATC Firing Test Results	Results	A Section of Section 2			
	Average	Dally	Average	Average	Tolal Mass	Substance	Substance
	Actual	Backdround	Aajusted Emission	Adjusted	of Substance Emitted	Concentration	Emission
Compound	Concentration	Concentration	Factor (EF)	Factor	(drams/lem)	(orams/m³)	rate (c//lam)/sac
	(mg/m³)	(mg/m³)	(fb/item)	(Ib/Ib NEW)		CONC	ER,
Anthracene	1.80E-05	1.86E-05	Q	QN	QN	CIN	UN
Fluoranthene	5.38E-05	1.86E-05	1.80E-10	2.82E-08	8.156E-08	6.672F.12	4 078F-08
Pyrene	5.12E-05	1.86E-05	1.71E-10	2.68E-08	7.749E-08	6.338E-12	3 874F-08
Benzo(a)anthracene	1.80E-05	1.86E-05	Q	QN	QN	QN	CN
Chrysene	1.80E-05	1.86E-05	Q	QN	QN	GN	QN
Benzo(b)fluoranthene	1.80E-05	1.86E-05	QN	Q	N	QN	Ĉ
Benzo(k)fluoranthene	1.80E-05	1.86E-05	QN	QN	ON	S	S
Benzo(e)pyrene	1.80E-05	1.86E-05	QN	QN	QN	QN	S
Benzo(a)pyrene	1.80E-05	1.86E-05	QN	QN	QN	QN	CN
Indeno(1,2,3-cd)pyrene	1.80E-05	1.86E-05	QN	Q	QN	S	CN
Dibenz(a,h)anthracene	1.80E-05	1.86E-05	Q	QN	ON	QN	CN
Benzo(g,h,i)perylene	1.80E-05	1.86E-05	g	QN.	QN	S	CN
Dioxins and Furans						76.00	
2378-TCDD		4.16E-09	Q	S	ON	GN	S
12378-PECDD	2.97E-09	2.33E-09	QN	QN	QN	QN	CZ
123478-HXCDD	2.88E-09	2.17E-09	ON	ND	QN	QN	QN
1236/8-HXCDD	2.96E-09	2.21E-09	QN	QN	ON	QN	QN
123788-HAUDU 42348-100000		2.06E-09	8	Q	ON	QN	QN
OCDD	4.84E-09	3.73E-09	5.14E-15	8.06E-13	2.330E-12	1.906E-16	1.165E-12
9478_TCNE	0.07E-U8	4.43E-08	9.21E-14	1.45E-11	4.179E-11	3.418E-15	2.089E-11
42278 DECNE	Z.U0E-U9	1.72E-09	Q.	QN	ND	ND	ON ON
123/0-FEUUF		2.09E-09	QN	Q	ON	QN	S
234/8-PECUF	2.62E-09	2.13E-09	Q	Q	QN	ON	QN
123478-HXCDF	1.72E-09	1.32E-09	Q	Q	ON	ON	QN
123078-FIACUI-	1.75E-09	1.32E-09	2	ON	ON	ON.	9
123789-FIXCDF	4.49E-09	3.45E-09	Q	Q	ON .	Q	QN
434076-FIACIJF	1.92E-09	1.42E-09	Q	S	ON	QN	S
1234078-HPCDF	1.42E-09	1.27E-09	9.82E-16	1.54E-13	4.456E-13	3.645E-17	2.228E-13

B-10

Table B-1: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 100 meter location

	Cartric	Cartridge, 50 callber, Blank, M1A1 (M2)	lank, M1A1 (√2) ु	No. of rounds (I)	200 200 200 200 200 200	round
		Number of Items tested =>	ns tested =>	118	release duration (t):	2	seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	W. (lbs.) =>	8.37E-03	Unit Concentration (UC):	1,636E-04 g/m ³ /(g/s)	g/m ³ /(g/s)
		ATC Firing Test Results	Results				
	Average	Dally	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
		Background	Emission	Emission	Emilled		Rate
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/liem)	(arams/m³)	(millam)/sec
	(mg/m³)	(mgm)	(Itb/item)	(IB/Ib NEW)		CONC	ER.
1234789-HPCDF	2.21E-09	2.54E-09	QN	ON.	GN	CIN	CN
OCDF	4.46E-09	3.65E-09	1.49E-14	2.34E-12	6.7615-12	5 531E 18	3 384E 40
Energelics			NG CONTRACTOR			01-31000	0.00 IE-12
Nitrobenzene	3.51E-03	NA	QN	QN	QN	J.	
2-Nitrotoluene	3.51E-03	NA	QN	QN	CN		Q Q
3-Nitrotoluene	3.51E-03	NA	QN	QN	QN	G CN	
4-Nitrotoluene	3.51E-03	NA NA	QN	QN	CN	S	2 2
Nitroglycerine	3.51E-03	NA	QN	ON N	QN QN	C N	
1,3-Dinitrobenzene	3.51E-03	AA	QN	QN	ON	CN	
2,6-Dinitrotoluene	3.51E-03	NA	<u>Q</u>	S	QN	CN	
2,4-Dinitrotoluene	3.51E-03	NA	QN	Q	QN	GN	CN
1,3,5-1 rinitrobenzene	3.51E-03	NA	ON ON	S	GN	QN	CN CN
Z,4,6-1 rinitrotoluene	3.51E-03	NA	QN	QN	QN	QN	GN
KIJX	3.51E-03	NA	QN	QN	ON	ON	ON ON
2 Aming 4 & Dinitratelland	3.51E-03	NA	2	S	QN	QN	ON
Total	3.51E-03	NA	2	Q	ON	Q	QN
I GH YI	3.51E-03	NA	2	ND	ON	<u>Q</u>	QN
LIIVIA	7.02E-03	NA	2	Q	GN	QN.	CN
Pentaerythritoltetranitrate	7.02E-03	NA	ON	QN	ON	QN	S
Dibutyi phthalate	1.76E-01	NA	QN	QN	NO	S	S
Dioctyl phthalate	1.76E-01	NA	Q	QN	GN	S	CN
Dipnenylamine	8.78E-02	NA	ON	2	ND	QN	GN
Footnotes:							

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emission Study)

NA = Not Applicable ND = Not Detected

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

	Cantridge	Cattildge, 50 callber, Blank, M1A1 (M2)	ink, M1A1 (M.	2)	No. of rounds (I)		1 Found
		Number of Items tested =>	v= bested =>	7 aga 11 ga 🙎	release duration (t):		3 seconds
	Net Explosi	isive Weight - N.E.W. (lbs.) ≅>	W. (lbs.) =>	6.37E-03	Unit Concentration (UC):	6,870E-05	6.870E-05 g/m³/(g/s)
	ATC	C Firing Test Results	ults				
	Average	Dally	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission		(grams/m³)	
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/ilem)		(a/illem)/sec
	(mg/m³)	(mg/m³)	(lb/item)	(lb/lb NEW)		CONC	88
Permanent Gases			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				
Ammonia (NH3)	3.50E+00	NA	1.03E-05	1.62E-03	4.683E-03	1 072F-07	1 4615 03
Carbon Dioxide (CO2)	7.16E+02	ΑN	2.11E-03	3.31E-01	9.574E-01	2.192F-05	3 1915-01
Carbon Monoxide (CO)	6.16E+02	NA	1.82E-03	2.85E-01	8.248E-01	1.889E-05	2.749F.01
Oxides of Nitrogen (NOx)	6.09E+00	NA	1.80E-05	2.82E-03	8.147E-03	1.866E-07	2.716F-03
Sulfur Dioxide (SO2)	2.62E-01	NA	7.73E-07	1.21E-04	3.506E-04	8.028E-09	1.169E-04
Acid Gasas							The second secon
Hydrogen Fluoride	2.30E-01	2.20E-01	QN	QN	QN	ND	QN
Hydrogen Chloride	2.25E-01	2.10E-01	QN	ON	ON	ON	GN
Hydrogen Bromide	2.20E-01	2.10E-01	Q	N ON	QN	QN	S
Nitric Acid	2.20E-01	2.10E-01	QN	QN	ON	NO NO	CN
Phosphoric Acid	2.20E-01	2.10E-01	QN	QN	QN	QN	CN
Sulfuric Acid	9.95E-01	2,10E-01	4.92E-06	7.72E-04	2,232E-03	5.111E-08	7.439E-04
CYANIGO TO THE							
Particulate Cyanide	1.25E-02	1.20E-02	QN	DN	ND	ON	NON NO
Hydrogen Cyanide	3.50E-01	2.50E-02	1.17E-06	1.84E-04	5.305E-04	1,215E-08	1.768F-04
Particulates							
Total Suspended Particulate	2.77E+01	NA	9.26E-05	1.45E-02	4.199E-02	9.615E-07	1.400E-02
Particulate Matter <10 microns	3.13E+01	NA NA	1.04E-04	1.64E-02	4.737E-02	1.085E-06	1.579E-02
Particulate Matter <2.5 microns	2.81E+01	NA	9.38E-05	1.47E-02	4.257E-02	9.748E-07	1.419E-02
Motals							
Aluminum	5.81E-01	4.34E-02	1.94E-06	3.05E-04	8.805E-04	2.016E-08	2 935F-04
Antimony	3.18E+00	9.88E-01	7.67E-06	1.20E-03	3.480E-03	7.968E-08	1.160F-03
Arsenic	1.04E-02	1.09E-02	Q	QN	ON	QN	SICN
Barium	1.36E+00	4.34E-02	4.54E-06	7.13E-04	2.061E-03	4.719E-08	6.870E-04
Beryllium	4.15E-02	4.34E-02	S	ND	ON	ON	NO
Cadmium	4.15E-02	4.34E-02	Q	ND	GN	GN	ND
Carcium	2.87E-01	1.99E-01	3.73E-07	5.85E-05	1.690E-04	3.870E-09	5,633E-05

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

				A State of the State of			
		Number of Items tested =>	ns (ested =>		release duration (t):	8	seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.)	W. (lb8.) =>	6.37E-03	Unit Concentration (UC):	6.870E-05 g/m³/(g/s)	(8/B)/, m/B
	۷	TC Firing Test Results	ults'			という。	
	Average	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission	Emilled	(grams/m³)	2 2
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/item)		(a/ltem)/sec
	(mg/m³)	(mg/m²)	(lb/item)	(Ib/lb NEW)		CONC	ER.
Chromium	4.15E-02	4.34E-02	QN	QN	ON	QN	CN
Cobalt	4.15E-02	4.34E-02	QN	QN	QN	QN	
Copper	4.13E-01	9.30E-02	1.11E-06	1.74E-04	5.017E-04	1.149E-08	1.672F-04
Lead	3.73E+00	5.95E-02	1.22E-05	1.92E-03	6.554E-03	1.272E-07	1.851E-03
Magnesium	4.15E-02	4.34E-02	QN	QN	QN	QN	CN
Manganese	4.15E-02	4.34E-02	QN	QN	QN	ND ND	GN
Nickel	4.15E-02	4.34E-02	ON	QN	QN	S	CN
Selenium	1.04E-02	1.09E-02	ON	QN	QN	N N	GN
Silver	4.15E-02	4.34E-02	QN	QN	QN	S	CN
Inallium	4.15E-02	4.34E-02	· QN	QN	QN	N	CN
Vanadium	4.15E-02	4.34E-02	QN	Q	QN	QN	CN
Zinc	1.48E-01	4.34E-02	4.94E-07	7.75E-05	2.240E-04	5,129E-09	7 466E.05
TO-11 Carbonyls							
Formaldehyde	2.46E-02	1,23E-01	8.19E-08	1.29E-05	3.715E-05	8.506E-10	1 2385-05
Acetaldehyde	1.80E-01	1.80E-01	QN	QN	QN	ON ON	ND
Acetone	1.19E+00	1.19E+00	ON	QN	QN	QN	GN GN
Acrolein	2,29E-01	2.29E-01	QN	ON	QN	QN	GN
Froprionaldenyde	2.37E-01	2.37E-01	QN	S	QN	ND	QN
Gridenyde Britishopida	2.87E-01	2.87E-01	2	Q	QN	QN	ND ND
Domaidobuda	Z.95E-01	2.95E-01	Q	QN	QN	QN	ND
Delizaldeliyde Isonolorollohuda	4.34E-01	4.34E-01	S	QN	ON	QN	ND
Isovaleraldenyde	3.52E-01	3.52E-01	<u>Q</u>	ON	QN	SN.	ND
valeraldenyde	3.52E-01	3.52E-01	Q	ON	QN	ON ON	QN
o,m,p-1 olualdehyde	4.91E-01	4,91E-01	ON	QN	QN	ON.	GN
Hexaldehyde	4.10E-01	4.10E-01	ON	QN	QN	ON	QN
z,5-Uimetnyibenzaidenyde	4.10E-01	4.10E-01	ON	ON	QN	QN	QN
Propene	9.47E-03	1.72E-03	3.16E-08	0	1.433E-05	3.282E-10	4.777E-06

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

	Cartridg	Cartridge, 50 caliber, Blank, M1A1 (M2)	ink, M1A1 (M	2)	No. of rounds (I)		round
		Number of items tested =>	ms tested =>		release duration (t):	8	3 seconds
	Net Explos	sive Weight - N.E.W. (lbs.) =>	.W. (lbs.) =>	6.37E-03	Unit Concentration (UC):	8.870F.05	8.870E.05 a/m³/(a/s)
	ATC	C Firing Test Results	ıults				
	Average Measured	Dally Measured	Average	Average	Total Mass	Substance	Substance
	Actual	Background	Emission	Emission		Concentration	Emission
Compound	Concentration	Concentration	Factor (EF)	Factor	(drams/liem)		Kate
	(mg/m³)	(mg/m³)	(lb/ftem)	(Ibilb NEW)		CONC	G//(GM/)/Sec FR
Dichlorodiffouromethane	2.97E-03	2.97E-03	1.14E-09	1.79E-07	5.167E-07	1 1835 11	4 YOOF 07
Chlorodifluoromethane	3,54E-03	3.54E-03	QN	QN	GN	ND ND	I./ZZE-U/
Freon 114	6.99E-03	6.99E-03	QN	ND	QN ON		ON CN
Chloromethane	1.55E-03	2.07E-03	5.14E-09	8.07E-07	2.331E-06	5.339F_11	7 779E 07
Vinyl Chloride	2.56E-03	2.56E-03	QN	QN	QN	CN	ND-01
1,3-Butadiene	2.21E-03	2.21E-03	QN	QN	QN	GN CN	QN
Bromometnane	3.88E-03	3.88E-03	QN	QN	QN	CN	
Chloroethane	2.64E-03	2.64E-03	QN	ON	QN	CN	ON UN
Ulchloroffuoromethane Tight	4.21E-03	4.21E-03	ON	ON	QN	ON ON	
Highermonemane	1.69E-03	1.69E-03	6,47E-10	1.02E-07	2.935E-07	6 722E-12	Q 784E_08
remane	2.95E-03	2.95E-03	GN	QN	QN	GN	ND
A College	1.03E-02	2.29E-03	3.44E-08	5.41E-06	1.563E-05	3.578E-10	5 209E-08
I, I-Dichioremene	4.05E-03	4.05E-03	QN	QN	QN	QN	ND
Volence	7.68E-03	7.68E-03	QN	QN	QN	QN	ON ON
Acetone	1.86E-01	6.89E-02	4.16E-07	6.53E-05	1.888E-04	4.323F-09	R 202F_0R
Wetnyi lodide	5.81E-03	5.81E-03	QN	QN	ND NO	QN	ND
Acetonitrite	3.11E-03	3.11E-03		DN	N	QN	QN
3-Chloronronene	5,68E-U3	1.68E-03	1.96E-08	3.07E-06	8.869E-06	2.031E-10	2.956E-06
Methylene Chloride	3.13E-03	3.13E-03	QN	QN	QN	QN	QN
tert-Butvl Alcohol	9.10E-02	20-2010	1.88E-07	2.97E-05	8.587E-05	1.966E-09	2.862E-05
Acrylonitrile	2.03E-03	3,U3E-U3	ON O Los	QN .	ON	QN	S
trans-1.2-Dichloroethene	3 0RE 02	2.17E-U3	0.88E-U9	1.08E-06	3.120E-06	7.144E-11	1.040E-06
Methyl t-Bulyl Ether	2.20L-03	3.805-03	2	<u>Q</u>	QQ	QN	QN
Hexane	3.01E-U3	3.01E-03	ON I	Q	QN	ND	ND
1.1-Dichloroethane	1,2/E-UI	3,04E-UZ	Z.55E-07	4.01E-05	1.158E-04	2.653E-09	3.861E-05
Vinyl Acetate	3.57 E-U3	3.87E-03	2 2	QN	QN	QN	GN.
cis-1.2-Dichloroethene	3 08E 03	3.02E-03		Q	QN	QN	QN
	20-106.0	3.80E-03	ON	QN	QN	QN	GN

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

	Cartridge	ge, 50 caliber, Blank, M1A1 (M2)	ink, M1A1 (M	2	No. of rounds (I)		round
		Number of Hems lested =>	ns tested =>		release duration (t):		seconds
	Rei Expios	Net Explosive Weight - N.E.W. (lbs.) =>	W. (IDS.) =>	6.37E-03	Unit Concentration (UC):	6.870E-05	6.870E-05 g/m 1(g/s)
	₹	C Firing Test Results	ults'				
	Average Measured	Daily Measured	Average	Average	Total Mass	Substance	Substance
	Actual	Background	Emission	Emission		Concentration	Emission
Compound	Concentration	Concentration	Factor (EF)	Factor	(drams/fiem)		Kate
	(mg/m³)	(mg/m²)	(Ib/item)	(Ib/lb NEW)		CONC	ER.
2-Butanone	2.95E-03	2.95E-03	QN	S	CZ	ND	G.Z
Ethyl Acetate	3.60E-03	3.60E-03	QN	QN	CN	S IN	
Methyl Acrylate	3.52E-03	3.52E-03	QN	QN	CN	ON ON	ON S
Chloroform	4.88E-03	4.88E-03	N ON	QN	CN	GN	ON CIV
1,1,1-Trichloroethane	1.36E-03	2.18E-03	QN	QN	CN	ON ON	ON CIA
Carbon Tetrachloride	6.29E-03	6.29E-03	QN	QN	QN	CN	ON
1,z-Dichlorethane	4.05E-03	4.05E-03	Q	S	S. C.	CN	GN GN
Benzene	7.03E-02	6.39E-04	2.33E-07	3.65E-05	1.055E-04	2.416F-09	3 5175.05
Soociane	4.67E-03	4.67E-03	QN	QN	QN	QN	ON
Teptane	4.10E-03	4.10E-03	2	Q	QN	GN	QN
richioroethane	4.88E-03	4.88E-03	QN	Q	NO NO	GN	
t 2 Piete	4.09E-03	4.09E-03	QN	Q	QN	QN	ON ON
Mothal Mathacadat	4.62E-03	4.62E-03	S	QN	ON	NO.	CN
Dibromomothono	4.09E-03	4.09E-03	<u>Q</u>	Q	QN	QN	QN
4 A Dissans	7.11E-03	7.11E-03	S	QN	QN	S.	QN .
Rromodichloromoff.co.	3.60E-03	3.60E-03	Q	2	DN	QN	QN
4-Methyl-2-Pentanona	6.70E-03	6.70E-03	2	QN	QN	QN	ON
Toluene	4,10E-03 3.77E_03	4.10E-03	ND V	QN I	QN	ON	ON
Octane	4 675-03	7.7 E-03	I.ZOE-U0	1.9/E-U6	5.699E-06	1.305E-10	1.900E-06
trans-1,3-Dichloropropene	4 54E-03	A RAE OS			NO.	QN	ON
Ethyl Methacrylate	4.67F.03	4.04E-03	ON CIV	2 2	ON	CN	QN
1,1,2-Trichloroethane	5.46F-03	5 ARE 02		ON S	ON	QN	QN
Tertrachloroethene	6.78E-03	6.78E-03		CE CE	ND ND	QN :	QN
2-l-lexanone	4.10E-03	4 10F-03	2 2				QN
Dibromochloromethane	8.52E-03	8.52F-03	2 2			ON	Q.
1,2-Dibromoethane	7.68E-03	7.68E-03	2	2 2	ON ON	2 2	QN.
Chlorobenzene	4.60E-03	4.60F-03			GN GN	ON!	QQ.
mineral services and the services of the servi		T ~~ ~~~	3	7	ND I	ON O	2

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

	Cartridg	Cartridge, .50 caliber, Blank, M1A1 (M2)	ink, M1A1 (M	2)	No. of rounds (I)		round
		Number of Items (ested =>	ns tested =>	81 J.L. 8	release duration (t):	8	seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	.W. (lbs.) =>	6.37E-03	Unit Concentration (UC):	6,870E-05 g/m³/(g/s)	(s/6)/, w/8
	ATC	C Firing Test Results	iults'			estin ing the single	
	Average	Dally	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission	Emitted	(grams/m³)	S S S S S S S S S S S S S S S S S S S
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/item)		(dillem)/sec
3	(mg/m³)	(mg/m³)	(lb/item)	(Ib/Ib NEW)		CONC	
1,1,1,2-Tetrachloroethane	6.87E-03	6.87E-03	QN	QN	ND	CN	CN CN
Ethylbenzene	4.34E-03	4.34E-03	S	S	QN	QN	QN QN
ın/p-Xylene	2.61E-03	4.34E-03	8.76E-09	1.38E-06	3.975E-06	9 104F-11	1 325E DE
o-Xylene	4,34E-03	4.34E-03	S	QN	ND	GN	ND AID
Styrene	2.56E-03	4.26E-03	8.60E-09	1.35E-06	3,900E-06	8.931E-11	1.300F.08
Bromotorm	1.03E-02	1.03E-02	QN	QN	N	QN	ND
Cumene	4.92E-03	4.92E-03	QN	ON	ON	CN	S S
1,1,2,2-Tetrachlorethane	6.87E-03	6.87E-03	Q	QN	ND	GN	
1,2,3-Trichloropropane	6.03E-03	6.03E-03	QN	GN	ND	QN	G N
Gromobenzene	6.42E-03	6.42E-03	QN	QN	QN	GN	N N
4-Ethyltoluene	4.92E-03	4.92E-03	QN	ND	GN	GN GN	S CN
1,3,5-1 rimethylbenzene	4.92E-03	4.92E-03	QN	Q	QN	QN	QN
Alpha Methyl Styrene	4.83E-03	4.83E-03	QN	ON	QN	ON.	CN
1,Z,4-1 rimethylbenzene	4.92E-03	4.92E-03	ON	QN	QN	ON	CN
1,3-Ulchlorobenzene	6.01E-03	6.01E-03	QN	ON	ND	QN	ON C
I,4-Ulchiorobenzene	6.01E-03	6.01E-03	ON	ON	QN	GN	CN
isenzyl Chloride	5.18E-03	5.18E-03	ON	ON	QN	ND	QN
L'z-Dichiotobenzene	6.01E-03	6.01E-03	Q	ON	QN	QN	CIN
1 2 4 Triphorphonesis	9.68E-03	9.68E-03	QN	NO NO	ND	S	GN
Hermonal and Control of the Control	7.42E-03	7.42E-03	QN	SP	QN	S	ON
Mon Transfer of the second of	1.0/E-02	1.07E-02	QN	Q	QN	SP	QN
VOC Tentatively identified Compounds (TICs)	ounds (TICs)						
Hydrocarbons					となっているので、大学のではなっている。		
Wetnane	1.96E+00	9.58E-01	3.73E-06	5.85E-04	1.690E-03	3.869E-08	5 632F-04
Ethylene	1.12E-01	2.29E-02	3.72E-07	5.84E-05	1.688E-04	3.866F-09	5 628E_05
Acetylene	5.99E-02	2.13E-02	2.00E-07	3.14E-05	9.073E-05	2.078E-09	3 024F.05
Ethane	2.46E-02	2.46E-02	QN	CN	QN	QN	CN
Propylene	3.44E-02	3,44E-02	QN	Q	QN	CN	CN
				**************************************			24

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

		Number of Items tested =>	ms tested =>		release duration (t):		3 seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	.W. (lbs.) =>	6,37E-03	Unit Concentration (UC):	6.870E-0	6.870E-05 g/m³/(g/s)
	ATC	3 Firing Test Results	aults				
	Average	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission	Emilled	(grams/m³)	Rate
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/ilem)		(d/item)/sec
	(mg/m³)	(mg/m³)	(lb/llem)	(Ib/Ib NEW)		SNOS	ER
Propane	3.61E-02	3.61E-02	QN	QN	QN	QN	CN
Propyne	3.20E-02	3.20E-02	QN	QN	QN	QN	GN
Isobutane	4.75E-02	4.75E-02	Q	Q	ON	QN	GN.
1-Butene/Isobutylene	9.18E-02	9.18E-02	ON	Q	ON	9	QN
1,3-Butadiene/butane	4.59E-02	4.59E-02	S	S	QN	ON	QN
cis-butene	4.59E-02	4.59E-02	QN	ND	QN	QN	QN
1-Bulyne	4.59E-02	4.59E-02	QN	ON	QN	ON	ON
trans-Butene	4.59E-02	4.59E-02	ON.	ON	QN	ON	QN
2-Butyne	4.42E-02	4.42E-02	ON	ON	QN	QN	Q
n-Pentane	5.90E-02	5.90E-02	QN	QN	QN	QN	S
n-Hexane	1.01E-01	7.05E-02	2.85E-07	4.48E-05	1.295E-04	2.965E-09	4.316E-05
SVOCs							
N-nitrosodimethylamine	1.80E-02	1.86E-02	Q	ON	Q	ND	QN
Bis(2-chloroethyl)ether	1.80E-02	1.86E-02	S	ON	QN	QN	9
Phenol	1.80E-02	1.86E-02	Q	ON	ΩN	QN.	QN
2-chlorophenol	1.80E-02	1.86E-02	QN	QN	QN	ON .	QN
1,3-dichlorobenzene	1.80E-02	1.86E-02	S	QN	ON	S	QN.
1,4-dichlorobenzene	1.80E-02	1.86E-02	2	QN	ND	QN	S
T,Z-dichiorobenzene	1,80E-02	1.86E-02	2	QN	ND	QN	QN N
Benzyl alcohol	1.80E-02	1.86E-02	2	QN	ON	ON	Q
Bis(2-chloroisopropyi)ether	1.80E-02	1.86E-02	S	Q	ON	N	S
Z-methylphenol	1.80E-02	1.86E-02	Q	QN	ON	QN	Q.
Flexachloroethane	1.80E-02	1.86E-02	Q	ND	QN	ND ND	QN
N-nitroso-di-n-propylamine	1.80E-02	1.86E-02	QV	QN	ND	ON	QN
4-methylphenol	1.80E-02	1.86E-02	QN	QN	QN	ON	QN
Nitrobenzene	1.80E-02	1.86E-02	Q	QN	QN	QN	QN
Isophorone	1.80E-02	1.86E-02	S	QN	QN	ON	QN
Z-nitrophenol	1.80E-02	1.86E-02	9	QN	GN	CN	214

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

	Cartridge	Cartridge, 50 caliber, Blank, M1A1 (M2	nk, M1A1 (M	2)	No. of rounds (I)		round
		Number of items tested =>	ns lested =>	10 m	release duration (t):	8	seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	W. (lbs.) =>	6.37E-03	Unit Concentration (UC):	6.870E-05 g/m³/(g/s	g/m³/(g/s)
	A	C Firing Test Results	ults'				
	Average	Daily	Average	Average	Total Mass	Substance	Substance
	Artinal	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
Compound	Concentration	Concentration	Factor (FF)	Emission		(grams/m³)	Rate
	(mg/m³)	(ma/m³)	(lb/item)	THAT NEW			(g/ltern)/sec
2,4-dimethylphenol	1.80E-02	1.86E-02	QN	S	ON ON		
Bis(2-chloroethoxy)methane	1.80E-02	1.86E-02	QN	2			QN S
2,4-dichlorophenol	1.80E-02	1.86E-02	<u>N</u>	QN		ON CN	ON C
1,2,4-trichlorobenzene	1.80E-02	1.86E-02	S	QN	QN		ON
Naphthalene	9.31E-03	1.86E-02	3.06E-08	4.80E-06	1.388E-05	3 179F.10	4 827E 08
4-cnioroanline	1.80E-02	1.86E-02	QN	Q	ON	ON.	ND
rexacritorobutadiene	1.80E-02	1.86E-02	QN	QN	QN	QN	CN
4-cinoro-3-memyipnenoi	1.80E-02	1.86E-02	DN	QN	QN	QN	GN
Z-memymaphmalene	1.80E-02	1.86E-02	QN	ON	ON	QN	GN
riexaci iioi ocyclopentadiene	1.80E-02	1.86E-02	NO NO	QN	QN	GN	QN
2,4,6-trichlorophenol	1.80E-02	1.86E-02	ON	QN	QN	GN	
2 objects the state of the stat	1.80E-02	1.86E-02	QN	ND	QN	Q	CN
2 nitropulling	1.80E-02	1.86E-02	Q	NO	QN	QN	QN
Acensobstydono	1.80E-02	1.86E-02	Q	NO	ON	GN	QN
Acertaphiniyiene Dimethylehthalete	1.80E-02	1.86E-02	2	ND	QN	ON	QN
2 6-dinitrotolilana	1.80E-02	1.86E-02	Q	ON	QN	QN	ON
Acenaphthene	1.80E-UZ	1.86E-02	9	Q	ON	QN	QN
3-nitroaniline	3.60E-02	1.80E-UZ	2 2	Q	ON I	ON	QN
2,4-dinitrophenol	3.60E-02	3.715.02	2 2		QN	ON	ON
Dibenzofuran .	1 80F-02	1 86E-02		2 2	ON	QN	ON
2,4-dinitrotoluene	1.80F.02	1.80L-02	2 2	2	ON ON	QN	QN
4-nitrophenol	3 60F.02	3.74E.02		2 2	ON	Q	QN
Fluorene	1 80E.03	3.7 IE-UZ	2 5	S	QN	ND	QN
4-chlorophenyl-phenylether	1 800.02	1,000-02		ON!	QN	QN	9
Diethylphthalate	1.00L~0Z	1.80E-UZ		2	ON	QN	QN ON
4-nitroaniline	3.60E-02	1.00E-UZ		2	QN	QN	ND
4.6-dinitro-2-methylphenol	3 ROF-02	3 74 = 00	2 2	ON S	OZ.	ON	S
	70.700	0.7 11.702	ON.	ON I	QN	QN	QN

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

	Cartridge	ge, .50 callber, Blank, M1A1 (M2)	ink, M1A1 (M	2) % ***********************************	No. of rounds (I)		round
		Number of Items tested =>	ms tested =>		release duration (t):	6	seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	W. (lbs.) =>	6.37E-03	Unit Concentration (UC):	6,870E-05 g/m³/(g/s	(s/0)/, w/6
	A	C Firing Test Results	ıults'				
	Average	Dally	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
Compound	Concentration	Concentration	Factor (EF)	Factor	Carams(llem)	(grams/m²)	Rate
	(mg/m ₂)	(mg/m²)	(lb/item)	(Ib/Ib NEW)		2 0 00	(g/melni//sec ER,
N-nitrosodiphenylamine(1)	1.80E-02	1.86E-02	GN	ND	NO	GN	UN CANADA
4-bromophenyl-phenylether	1,80E-02	1.86E-02	QN	ON	QN	QN	G Q
Hexachlorobenzene	1.80E-02	1.86E-02	QN	ON	QN	ON ON	GN
Pentachlorophenol	3.60E-02	3.71E-02	GN	QN	QN	S	CN
Phenanthrene	1.80E-02	1.86E-02	ΠN	QN	QN	SN.	GN
Anthracene	1.80E-02	1.86E-02	QN	QN	QN	ON	GN
Ui-n-butyiphthalate	1,80E-02	1.86E-02	QN	QN	QN	QN	QN
Fluoranthene	1.80E-02	1.86E-02	QN	QN	QN	QN	CN
Pyrene	1.80E-02	1.86E-02	QN	DN	QN	QN	S
Butyibenzylphthalate	1,80E-02	1.86E-02	QN	QN	NO.	QN	ON
Benzo(a)anthracene	1.80E-02	1.86E-02	QN	QN	ND	QN	QN
Chrysene	1.80E-02	1.86E-02	Q	ON	QN	QN.	QN
3,3-dichiorobenzidine	1.80E-02	1.86E-02	S	ND	QN	QN	QN
Bis(z-etnylinexyl)phthalate	3.95E-01	7.79E-01	Q	QN	QN	QN	QN
UI-n-octylphthalate	1.80E-02	1.86E-02	Q	QN	ND	ND ND	QN
Denzo(b)nuoraninene	1.80E-02	1.86E-02	QN	QN	ON	QN	QN
Denzo(k)nuoranmene	1.80E-02	1.86E-02	Q	S	QN	QN	QN
pelizu(a)pyrene	1.80E-02	1.86E-02	Q	Q	QN	QN	QN
Dibenz(a h)anthracene	1.80E-0Z	1.86E-02	Q	Q.	ON	GN	QN
Bonzo(a h lyandana	1,00E-02	1,005-02	Q.	ON.	QN	QN	Q
Delizo(g,ri,r)perylene	1.80E-02	1.86E-02	QN	ON	ON .	QN	S
SVOC Tentatively Identified Compounds (TICS)	pounds (TICs)						
WAY (PATS)							
Naphmalene	6.39E-03	2.60E-03	1.36E-08	2.14E-06	6.178E-06	1.415E-10	2.059E-06
Acenaphthylene	1.60E-04	1.86E-05	5.36E-10	8.42E-08	2.433E-07	5.571E-12	8.110E-08
Acenaphthene	3.87E-05	2.23E-05	6.32E-11	9.92E-09	2.867E-08	6.566E-13	9.557E-09
r-luorene	4.93E-05	1.86E-05	1.65E-10	2.59E-08	7,476E-08	1.712E-12	2.492E-08
rnenantirene	8.79E-05	5.19E-05	1.40E-10	2.20E-08	6.371E-08	1.459E-12	2.124E-08

	Sallings	le, .ou caliber, blank, MTA1 (MZ)	IIK, MIM (M)		No. of rounds (I)		round
		Number of Items tested =>	ns tested =>	**************************************	release duration (t):		seconds
	Net Explos	Net Explosive Weight - N.E.W. (lbs.) =>	W. (lbs.) =>	6,37E-03	Unit Concentration (UC):	6.870E-05	(8/B)/, w/B
	A	S Firing Test Results	ults				2
	Average	AlleO	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission	Emitted	(grams/m³)	Rate
o de la composition della comp	Concentration	Concentration	Factor (EF)	Factor	(grams/item)		(g/item)/sec
	(,w/g/m)	(mg/m²)	(lip/item)	(Ib/lb NEW)		ONOO	E E
Anthracene	1.80E-05	1.86E-05	QN	ON	QN	QN	CN
riuoranthene	5,38E-05	1.86E-05	1.80E-10	2.82E-08	8.156E-08	1.868E-12	2.719F-08
Pyrene	5.12E-05	1.86E-05	1.71E-10	2.68E-08	7.749E-08	1.774E-12	2.583E-08
Delizo(a)animacene	1.80E-05	1.86E-05	QN	ND	QN	QN.	GN
Cillysene	1.80E-05	1.86E-05	QN	QN N	QN	ON	QN .
Benzo(b)filoranthone	1.80E-05	1.86E-05	Q	QN	ND	S S	QN
Desired(n)iidolaiidieile	1.80E-05	1.86E-05	Q	QN	2	QN.	QN
Benzo(e)pyrene	1.80E-05	1.86E-05	QN	QN	QN	QN	S
benzo(a)pyrene	1.80E-05	1.86E-05	ON	QN	QN	N ON	CN
indeno(1,2,3-cd)pyrene	1.80E-05	1.86E-05	QN	ON N	ON	ON	GN
Ulbenz(a,n)antinracene	1.80E-05	1,86E-05	S	ON	QN	QN	GN
denzo(g,n,J)perylene	1.80E-05	1.86E-05	QN	ON	ON	ON ON	S
DIOXINS AND FURANS							
23/8-1 CDD	4.95E-09	4.16E-09	ΩN	DN	QN	QN	S
12378-PECDD	2.97E-09	2.33E-09	QN	ND	ON	N	S
123478-HXCUD	2.88E-09	2.17E-09	QN	ND	QN	ND	GN
123070-HAUDU	2.98E-09	2.21E-09	Q	QN	ON	QN	QN
1234678-HPCDD	2.74E-09	2.06E-09	QN	QN	ND	QN	ON
	4.64E-09	3,73E-09	5.14E-15	8.06E-13	2.330E-12	5.335E-17	7.766E-13
2378.TCDF	0,075-00	4.43E-08	9.21E-14	1.45E-11	4.179E-11	9.569E-16	1.393E-11
40378.DECDE	2.00E-09	1.72E-09	Q	2	ON	ON	QN
23/10-1 EOD!	Z.30E-09	2.09E-09	Q	Q	ND	ON	QN
403479 LIVORE	Z.6ZE-09	2.13E-09	Q	Q	NO	S	S
123410-UACUF	1.72E-09	1.32E-09	Q	SD	QN	GN	QN
123010-HACUF	1.75E-09	1.32E-09	Q	ND	QN	. QN	S
123703-TACUF	4.49E-09	3.45E-09	S	QN	ND	ND ON	QN
4334678 UDCDF	1.92E-09	1.42E-09	2	QN	ND	ON	QN
1234070-117-017F	1.42E-09	1.27E-09	9.82F-16	1 54F-13	7 ARGE 42	7 1000 P	

Table B-2: Air Modeling Output Data for the Cartridge, .50 Caliber Blank, M1A1 (M2) - 200 meter location

	Cartridg	Cartridge, .50 caliber, Blank, M1A1 (M2)	nk, M1A1 (M	2	No. of rounds (I)		round
		Number of Items (eated =>	ns tested =>	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	release duration (t):	10	seconds
	Net Explos	Not Explosive Weight - N.E.W. (lbs.) =>	W. (lbs.) =>	6.37E-03	Unit Concentration (UC):	6,870E-05 g/m ³ /(g/s)	g/m ³ /(g/s)
	ATC	C Firing Teat Results	ults				
	Average	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Background	Emission	Emission	Emitted	(arams/m³)	
Compound	Concentration	Concentration	Factor (EF)	Factor	(grams/item)		(g/ilem)/sec
	(m/d/m)	(mg/m²)	(lb/item)	(Ib/Ib NEW)		CONC	R
1234789-HPCDF	2.21E-09	2.54E-09	QN	S	QN	QN	CIN
OCDF	4,46E-09	3.65E-09	1.49E-14	2.34E-12	6.761E-12	1.548F-16	2 25AE-12
Energelics	12 A				(2) (2) (2) (2) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4		71_71_77
Nitrobenzene	3.51E-03	NA NA	QN	ON	QN	S	GN
2-Nitrotoluene	3,51E-03	NA	Q	QN	QN	GN	
3-Nitrotoluene	3.51E-03	NA	QN	QN	QN		
4-Nitrotoluene	3.51E-03	NA	2	S	QN	CN	GN GN
Nitroglycerine	3.51E-03	NA	S	QN	QN	CN	22
1,3-Dinitrobenzene	3.51E-03	NA	Q	S	QN	QN	GN GN
2,6-Dinitrotoluene	3.51E-03	NA	QN	2	NON	QN	S
z,4-Umrtrotoluene	3.51E-03	NA	ON	QN	ND	QN	GN
1,3,5-1 rinitrobenzene	3.51E-03	NA	ON	QN	N	QN	GN C
Z,4,6-1 rinitrotoluene	3.51E-03	NA	QN	QN	QN	QN	N N
A Amino 2 & Dieffect I.	3.51E-03	AN	QN	Q	ND	QN.	QN
2. Amino 4.8 Distratolican	3.51E-03	NA	Q	QN	ND	QN	N
Total	3,51E-03	¥	Q	Q N	QN.	Q	QN
I EUL YI	3.51E-03	ΑΝ	QN	QN	QN	QN	QN
LIINIT	7.02E-03	NA	S	QN	QN	QN	
Pentaerythritoitetranitrate	7.02E-03	NA	QN	QN	ND	GN	CN
Dibutyl phthalate	1.76E-01	NA	Q	QN	QN	QN ON	
Dioctyl phthalate	1.76E-01	NA	Q	QN	S.	QN	CN
Ulphenylamine	8.78E-02	NA	QN	QN	QN	NO.	QN
r-ootnotes;						, , , , , , , , , , , , , , , , , , ,	

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emission Study)

NA = Not Applicable ND = Not Detected

APPENDIX C

HEALTH-BASED SCREENING LEVELS AND ACUTE TOXICITY VALUES

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Renion 3	Tovicity			7			
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG		AEGL	Source	
	- :	(m/grl)	(c or nc)	(mg/m ₃)	(c or nc)	(na/m³)	(Lia/m³)	/III/m³	(Linding)	il ic	
Permanent Gases							,	1	/ m/g/d)	(10 0)	(u/gr/)
Ammonia (NH ₃)	7664-41-7	1.04E+02	nc	104.39	nc	1.04F+02	1 75E+04	1 75E±04	VIV		
Carbon Dioxide (CO ₂)	124-38-9	NA		ΑN		N AN	NA	5 40E.407	V V	Li F	1.75E+04
Carbon Monoxide (CO)	630-08-0	1.00E+04	nc	NA		1 00F+04	2 305.105	2001-101-0	17/1	- 1	5.40E+07
Oxides of Nitrogen (as NO)	10102-43-9	1.00E+02	nc	¥		1.00F+02	A.SUE TOS	2.20E+03	¥ S	Цŀ	2.30E+05
Sulfur Dioxide (SO ₂)	7446-09-5	8.00E+01	nc	¥		8 00F+01	7 805402	7 00 - 100	Y .	- 1	3.08E+04
Acid Gases			***************************************			0.000	1,00L,10Z	7.00E+0Z	¥	<u> </u>	7.89E+02
Hydrogen fluoride	7664-39-3	NA N		NA		NA	1 ROE+03	4 645,00	4	L	
Hydrogen chloride	7647-01-0	2.08E+01	nc	2.08E+01	UC	2 08F+01	4 50E-103	4 475.03	≨ \$	ш	1.60E+03
Hydrogen bromide	10035-10-6	N		NA		NA		0 035.403	¥ ×	11	4.50E+03
Nitric Acid	7697-37-2	ΥN		NA		VIV	V V	9.935.103	NA S		9.93E+03
Phosphoric acid	7664-38-2	1.04E+01	nc	1.06E+01	20	1045+04	Z V	2.58E+03	1.30E+03	V	1.30E+03
Sulfuric Acid	7664-93-9	NA		AN	2	NA PAR	S	3.00E+03	ξĮ:	-	3.00E+03
Cyanide						V.		Z.UUE+03	≨	Ш	2.00E+03
Particulate Cyanide	57-12-5	NA		7 30F+04	Ç	7 305104	414	100			
Hydrogen Cyanide	74-90-8	3.13F+00	Ju	3 145.100	2 5	7.300.101	X	5.UUE+03	Ϋ́	-	5.00E+03
Particulates			2	3. I4E 100	2	3.13=+00	AN N	5.17E+03	¥	-	5.17E+03
Total Suspended Particulate	12789-66-1	5.00E+01	טט	VIV		700.					
PM ₁₀		5 00F±01				3.00E+01	NA.	¥N 	¥		NA NA
PM3		4 60 - 101	2	YN.		5.00E+01	¥	NA	NA		NA
Metals		1.30E+01	2	ΨN.		1.50E+01	ΑĀ	NA	NA		AN
Aluminum	7420 00 6	E 44 F. OO									
Antimony	7440-36.0	0.11E.±00	2	3.65E+00	2	5,11E+00	Ā	3.00E+04	¥	F	3.00E+04
Arsenic	7440-38-2	4 47E-04		1.46E+U0	ဥ	1.46E+00	≨	1.50E+03	NA	-	1.50E+03
Barium	7440-39-3	5 24E 04	إر	4.135-04	0	4.47E-04	¥	3.00E+01	NA	_	3.00E+01
Beryllium	7440-41-7	8 00E 04	2 ,	3.11E-01	20	5.21E-01	¥	1.50E+03	NA	 	1.50E+03
Cadmium	7440-43-9	1 07E-03	0 0	7.43E-04	0	8.00E-04	ΑN	5.00E+00	NA	F	5.00E+00
Calcium	7440-70-9	NA NA	יט	9.94E-04	υ.	1.07E-03	¥	3.00E+01	AN	F	3.00E+01
Chromitm	7440 47 9	¥N.		NA	ပ	W _A	NA	3.00E+04	¥N Y	L	3.00E+04
Coball	7440 40 4		O	1.53E-04	٥	1.53E-04	NA	1.50E+03	¥.	<u> </u>	1.50E+03
Conner	7440-40-4	Y S		2.20E+02	၁	2.20E+02	NA	6.00E+01	¥	ŀ	6.00E+01
Lead	7440-00-0	NA 4 EOFT : OC		1.46E+02	nc	1.46E+02	NA	3.00E+03	¥N	-	3.00E+03
Magnesium	7430 06 4	1.500	nc	Y N		1.50E+00	NA	1.50E+02	NA NA	F	1.50E+02
	1438-82-4	NA N		AN		NA	¥Ν	3.00E+04	¥	-	3.00F+04
								**************************************	***************************************	· []	

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity				7.1		
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	TEEL	AEGL	Source	2
		(mg/m³)	(c or nc)	(rag/m³)	(c or nc)	(µg/m³)	(mg/m³)	(m/gri)	(ma/m³)	(T or E)	(inalm3)
Manganese	7439-96-5	5,11E-02	nc	5.22E-02	ou ou	5 11E-02	ΔN	3 005.103	VIV		, 63
Nickel	7440-02-0	AN	W	7.30E+01	DC DC	7.30F+01	AN	3 005 403	NA VIV	- -	3.00E+03
Selenium	7782-49-2	NA		1.83E+01	UC	1.83E+01	L	6.00E+02	VZ	- -	3.00E+03
Silver	7740-22-4	NA		1.83E+01	nc	1.83E+01		3 00F+02	NA	- 1	0.00E+02
Thallium	7440-28-0	ΑN		2.56E-01	nc	2.56E-01	NA	3 00E+02	NA	- -	3.00E+02
Vanadium	7440-62-2	۸A		2.56E+01	nc	2.56E+01	NA	1 50F+02	VIA	- -	3.00E+02
Zinc	7440-66-6	NA		1.10E+03	nc nc	1.10E+03	NA	3 00E+04	V	- -	1.50E+02
TO-11 Carbonyls								10000	Z).	-	3.00E+04
Formaldehyde	20-00-0	1.48E-01	ပ	1.39E-01	၁	1.48E-01	1,23E+03	1.23E+03	NA	Ц	1 23E.4.03
Acetaldenyde	75-07-0	8.73E-01	ပ	8.13E-01	ပ	8.73E-01	1.80E+04		NA	ı lu	1 805-103
Acetone	67-64-1	3.65E+02	၁ပ	3.65E+02	nc	3.65E+02	NA	4	ž Š	J -	2 37E40R
Acrolem	107-02-8	2.09E-02	nc	2.08E-02	nc	2.09E-02	2.30E+02	1	₩ W	ш	2 30F±02
riopinonaidenyde	123-38-6	ΑN		۸A		ΑN	N A		W		7 50F+04
Crotorialdehide	4170-30-3	3.54E-03	C	3.30E-03	ပ	3.54E-03	5.72E+03	·	ΑN	. ш	5.72E+03
Danylakud	123-72-8	Z Z		Ϋ́		NA	Υ _N	7.38E+04	¥		7.38F+04
Derizarderiyae	100-52-7	3.65E+02	nc	3.65E+02	nc	3.65E+02	ΝΑ	1.50E+04	NA	-	1.50F+04
Isovaleraldenyde Voloroldebude	590-86-3	ΨN		N A		NA	ΝA	NA	NA		NA N
Valei aluei iyue o m n Tolioldahiida	110-62-3	NA:		ΝΑ		NA	ΑĀ	A A	NA		W
Unity - Foldandellydd Heveldebydd	1334-78-7	NA:		Ϋ́Α		NA	NA	Ϋ́	¥		NA
2 & Dimothulbongoldobioda	1-67-99	NA NA		NA		ΝΑ	NA	ΑN	MA		AN
z,5-Dimemyibenzaidenyde VOCs	5//9-94-2	¥		NA		NA	NA	NA	NA		N N
Dronous											
Diplomati	115-07-1	NA A		Α N		NA	NA	NA NA	¥		NA
Chlorodiffuoromothogo	8-L/-G/	2.09E+02	2	1.83E+02	nc	2.09E+02	NA	1.48E+07		 	1.48E+07
Fran 114	78.44.0	5.11E+04	22	5.11E+04	nc	5.11E+04	Ϋ́	4.41E+06		_	4.41E+06
Chloromethane	2-4-1-07	NA V		NA NA		ΥN	ΥN	2.10E+07		L	2.10E+07
Vinyl Chlorida	76.01.4	1.07=+00	O	1.79E+00	0	1.07E+00	Ϋ́	2.06E+05			2.06E+05
4 3 Butodions	10-01-4	Z.ZUE-UZ	၁	2.10E-02	ပ	2.20E-02	NA	1.28E+04		<u> </u> -	1.28E+04
1,3-butauterte Bromomothono	0-66-901	3.74E-03	ပ	3.48E-03	ပ	3.74E-03	2,20E+04	2.21E+04			2.20E+04
Oblomothono	74-83-9	5.21E+00	ည	5.11E+00	nc	5.21E+00	NA	5.82E+04		T	5.82E+04
Ciloblocofice	6-00-9	2.32E+00	nc	¥ N		2.32E+00	NA	2.64E+06			2.64F+06
Trichloroffuoromethane	75-71-8	2.09E+02	20	1.83E+02	nc	2.09E+02	ΑA	1.48E+07		-	1.48E+07
Pentane	400 66 0	/ .30E-r02	2	7.30E+0Z	nc	7.30E+02	¥	2,81E+06		Ŀ	2.81E+06
	0-00-601	MM		NA		MA	¥.	1.80E+06		L	1.80E+06

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Radion 3	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	НВЗГ	ERPG	TEEL	AEGL	Source	}
		(mg/m³)	(c or nc)	(ng/m³)	(c or nc)	(ua/m³)	(Lta/m³)	(ling/m ³)	3Em/m)		
Acrolein	107-02-8	2.09E-02	ne	2 DRE 02	200	00000	/	11	(ngd)		(mg/m)
1,1-Dichloroethene	75-35-4	5.21E+02	200	5 11E±02	110	Z.09E-02	2.30E+02	2.29E+02		Ш	2.30E+02
Freon 113	76-13-1	3.13F+04	2	3 145-104	110	3.21E+02	AN :	7.92E+04		L	7.92E+04
Acetone	67-64-1	3.65F+02	2 2	2 AKE 100	2	3.13E+04	¥.	9.58E+06		⊢	9.58E+06
Methyl Iodide	74-88-4	NA	2	3.035.102	20	3.65E+02	ΑA	2.37E+06		F	2.37E+06
Carbon Disulfide	75-15-0	7.30F+02	Ju	7 30E.103		NA	145000	1.45E+05		ш	1.45E+05
Acetonitrile	75-05-8	6 20E-101	2 6	7.30E+02	2	7.30E+02	¥Ν.	3.11E+04		F	3.11E+04
3-Chloropropene	107-05-1	1 04E±00	2 6	0.215+01	ည	6.20E+01	ΑA	1.01E+05		F	1.01E+05
Methylene Chloride	75-09-2	4 09F+00	2 .	3 70E 100		1.04E+00	9.39E+03	9.39E+03		ш	9.39E+03
tert-Butyl Alcohol	75-65-0	MA	٥	3.7.9E+00	0	4.09E+00	000969	6.94E+05		ш	6.96E+05
Acrylonitrile	107-13-1	2 83E 03	,	NA O CATE		¥.	¥	4.55E+05		L	4.55E+05
trans-1.2-Dichloroethene	158 80 E	7.00E-02	ပ	Z.61E-02	ပ	2.83E-02	21700	2.17E+04		Ш	2.17F+04
Methyl t-Butyl Ether	1834 04 4	7.305+01	20	7.30E+01	ဍ	7.30E+01	NA	4.95E+04		L	4.95E+04
Hexane	110.4-04-4	3.135+03	20	3.13E+03	nc	3.13E+03		4.32E+05		-	4.32F+05
1.1-Dichloroethane	76 34 2	Z.09E+0Z	ည	2.08E+02	nc	2.09E+02	¥N	5.28E+05		-	5 28F+05
Vinvl Acetate	13-54-3	5.21E+02	ဥ	5.11E+02	nc	5.21E+02	¥	1.21E+06		-	1 21E+06
cis-1 2.Dichlorosthona	108-05-4	2.09E+02	ဥ	2.08E+02	nc	2.09E+02	19150	1.76E+04		- 4	1 02 1 104
2-Bitanona	7-66-961	3.65E+01	nc	3.65E+01	nc	3.65E+01	NA A	7.92E+05		╬	7 925-105
Ethyl Acetate	78-83-3	1.04E+03	nc	1.04E+03	nc	1.04E+03	¥N	8.85E+05		- -	A ARELOR
Methyl Acrylate	141-78-6	3.29E+03	22	3.29E+03	nc	3.29E+03	NA	1.44E+06		- -	1.44F+06
Chloroform	87.88.3	1,10E+02	ou l	1.10E+02	20	1.10E+02	NA	NA			N
1,1,1-Trichloroethane	74.55.8	4 04F 102	၁	7.73E-02	ပ	8.35E-02	۸A	9.76E+03		F	9.76E+03
Carbon Tetrachloride	58.23.6	1.04E+03	2	2.30E+03	2	1.04E+03	.94E+06	1.91E+06		Ш	1.94E+06
1,2-Dichloroethane	107.08.2	7 305 00	ပ (- 10E-U1		1.28E-01	1.28E+05	1.26E+05		ш	1.28E+05
Benzene	71-43-2	2 49E-04	ی اد	0.88E-02		7.39E-02	¥	8.08E+03		F	8.08E+03
Isooctane (2,2,4-trimethylpentane)	540-84-1	NA)	4. IOE-UI	٥	2.49E-01	1.56E+05	1.60E+05		Ш	1.56E+05
Heptane	142-82-5	NA		\$ \$ \$		AA :	Y.	3.50E+05		 -	3.50E+05
Trichloroethane	71-55-6	1 04E+03		NA 2 30E 403		NA S	_	1.80E+06		F	1.80E+06
Ethyl Acrylate	140-88-5	1 40F-01	2 0	Z.30E+03	2	1.04E+03	9	1.91E+06		ш	1.94E+06
1,2-Dichloropropane	78-87-5	0 80E-02	1	AN CO		1.40E-01		6.14E+04		F	6.14E+04
Methyl Methacrylate	80-62-6	7.30F±02	٥	3.4 IE-02	υ	9.89E-02	ΑN	5.08E+05		 	5.08E+05
Dibromomethane	74-95-3	3 65E+01	2 2	7.30ETUZ 2.85E±04	21.0	7.30E+02	1	4.09E+05		_	4.09E+05
1,4-Dioxane	123-91-1	6.11E-01	2 0	5.00E+01	21 6	3.655+01	7	2.50E+05		Ш	2.50E+05
Bromodichloromethane	75-27-4	1 08F-01		4 04E 04	اد	0,115-01	7	9.00E+04		-	9.00E+04
		1	,	1.0.15-01	o l	1.08E-01	¥ Z	4.00E+03		H	4.00E+03

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity	File of Matter 1 To					3 x x 3 x 3 x 3 x 3 x 3 x 3 x 3 x 3 x 3
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	19E	AEGL	Source	Ę
		(hg/m³)	(c or nc)	(ng/m³)	(c or nc)	(m/gr/)	(tig/m³)	(mg/m³)	(tig/m³)	(T or E)	C mypn
4-Methyl-2-Pentanone	108-10-1	8.34E+01	nc	7.30E+01	٦ <u>۲</u>	8.34E+01	NA N	3.07F+05		-	3 075.105
Toluene	108-88-3	4.02E+02	nc	4.16E+02	nc	4.02E+02	1.88E+05	1.89E+05		- 11	1 88E.105
Octane	111-65-9	۷A		NA		NA	NA	¥N			NA NA
trans-1,3-Dichloropropene	10061-02-6	5.17E-02	ပ	4.82E-02	ပ	5.17E-02	NA	¥N			NA
Ethyl Methacrylate	97-63-2	3.29E+02	nc	3.29E+02	2	3.29E+02	NA	NA			NAN
1,1,2- I richloroethane	79-00-5	1.20E-01	၁	1.12E-01	ပ	1.20E-01	ΥN	1.64E+05		-	1 64F+05
Tetrachloroethene	127-18-4	3.31E+00	၁	3.13E+00	ပ	3.31E+00	NA	6.78E+05		. -	6 78F+05
Z-Hexanone	591-78-6	ΝΑ		5.11E+00	၁ပ	5.11E+00	ΑN	4.09E+04		- -	4 09F+04
Ulbromochloromethane	124-48-1	8.00E-02	၁	7.45E-02	၁	8.00E-02	ΑĀ	6.00E+03		-	6.00E+03
1,Z-Ulbromoetnane	106-93-4	8.73E-03	ပ	8.24E-03	ပ	8.73E-03	ΑN	1.54E+05		F	1.54E+05
Chlorobenzene	108-90-7	6.21E+01	nc	6.21E+01	nc	6.21E+01	¥	1.38E+05		- -	1.38E+05
1,1,1,2-1 etrachloroethane	630-20-6	2.60E-01	၁	2.41E-01	ပ	2.60E-01	¥	5.15E+04		-	5.15E+04
Etnyibenzene	100-41-4	1.06E+03	nc	1.06E+03	ည	1.06E+03	ΝΑ	5.43E+05			5.43F+05
m&p-Xylene	108-38-3 106-42-3	7.30E+02	nc	7.30E+03	nc	7.30E+02	NA	6.51E+05		-	6.51E+05
o-Xylene	95-47-6	7.30E+02	nc	7.30E+03	nc	7.30E+02	NA	6.51E+05			R R1E+OF
Styrene	100-42-5	1.06E+03	٦C	1.04E+03	nc	1.06E+03	2.13E+05	2.13E+05		- 11	2 13E+05
Bromoform	75-25-2	1.75E+00	ပ	1.61E+00	3	1.75E+00	NA	6.20E+03		<i>1</i>	6.10E-103
Cumene	98-82-8	4.02E+02	nc	4.02E+02	nc	4.02E+02	¥	2.46E+05		-	2.46E+05
1,1,2,2- letrachloroethane	79-34-5	3.31E-02	ပ	3.13E-02	၁	3.31E-02	¥	2.06E+04		-	2.06E+04
1,z,3-1 rchloropropane	96-18-4	9.61E-04	ပ	3.13E-03	၁	9.61E-04	NA	6.03E+04		F	6.03E+04
Diomopenzene	108-86-1	1.04E+01	nc	MA		1.04E+01	NA	4.82E+04		L	4.82E+04
4-Eurylioluene 4-2 E Trimothille	622-96-8	W		¥.		NA	NA	1.25E+05		F	1.25E+05
1,3,3-1 IIIII etti yibenzene	108-67-8	6.21E+00	22	6.21E+00	nc	6.21E+00	NA	3.68E+05		F	3.68E+05
1 2 4 Trimothulbonsone	98-83-9	2.56E+02	л С	2.56E+02	ည	2.56E+02	ΝΑ	NA	·		AN
1,2,4+ Hilliethylberizerie	9-63-6	6.21E+00	ဥ	6.21E+00	nc	6.21E+00	ΑN	1.80E+05			1.80E+05
1,3-Dichlorobenzene	541-73-1	3.29E+00	2	3.29E+00	nc	3.29E+00	NA	3.61E+04		F	3.61E+04
1,4-Diction openicene	1.06-46-7	3.06E-01	ပ	2.85E-01	ပ	3.06E-01		6.61E+05		<u></u>	6.61E+05
Benzyl Chloride	100-44-7	3.96E-02	ပ	3.68E-02	ပ		5.20E+03	5.17E+03		ш	5.20E+03
I,z-:Dichloroenzene	95-50-1	2.09E+02	ည	3.29E+01	2	2.09E+02	NA	3.01E+05		┢	3.01E+05
riexacilioretriane	6/-/2-1	4.80E-01	O	4.47E-01	ပ	4.80E-01	NA	2.90E+04		F	2.90E+04
I,z,4-Trichiorobenzene	120-82-1	2.08E+02	nc	2.08E+02	2	2.08E+02	NA	3.71E+04		L	3.71E+04
Texacillobutadiene	87-68-3	8.73E-02	υ	8.03E-02	ပ	8.73E-02	3.21E+04	3.20E+04		ш	3.21E+04

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	o sage migh		
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL.	ERPG	TEEL	AEGL	Source) ATA
		(fug/m³)	(c or nc)	(m/grl)	(c or nc)	(Lig/m³)	(tid/m³)	(na/m²)	(IIId/m ³)	T or E	6
Hydrocarbons							79 E E		(m,6,4)		C III/Reta
Methane	74-82-8	ΑN		NA NA		NA	MA	3 305 108		+	
Ethylene	74-85-1	NA A		AN	***************************************	NA	MA	4 AOE 105		- 1	3.30E+06
Acetylene	74-86-2	NA		N AN		NA	NA	NA 100.			4.60E+05
Ethane	74-84-0	ΝA		AN		NA	52	22			Y.
Propylene	115-07-1	AN		NA		CA VA	NA A	¥ ×			¥
Propane	74-98-6	NA		NA		S N	NA VIV	NA 2011			¥
Propyne (methyl acetylene)	74-99-7	NA		NA N		S N	¥ ×	3.785+06		-	3.78E+06
Isobutane	75-28-5	ΑN		NA	-	NAN	NA	0 K2E 40K		- -	2.79E+06
1-Butene/Isobutylene (115-11-7)	106-98-9	NA		NA		N N	NA	S R7E.LOG		-	9.52E+05
1,3-Butadiene/butane	106-99-0	3.74E-03	ပ	3.48E-03	0	3.74E-03	2.20E+04	2.27E+04		- 1	0.6/E+06
d Bultung	25167-67-3	NA		NA		NA	NA A	1.72E+04	NA	J -	4.20E+04
r-bulylle	107-00-6	ΑΝ		NA		AN	ΑN	NA N		-	NA NA
2-Button (protonuloss)	25167-67-3	¥		NA		AN	ΝA	1.72E+04	NA	-	1 72E404
z-butyne (crotoriyiene)	503-17-3	ΑΝ		NA		Ϋ́	¥N	NA		-	NA NA
	109-66-0	NA		NA		AN	NA	1 80F+08		1	4 805 100
II-Hexane	110-54-3	2.10E+02	nc	2.08E+02	20	2.10E+02	AN	5.28E+05		- 1	1.00E+U0 5.00E+06
SVOCS											0.20E+03
n-nitrosodimethylamine	62-75-9	1.37E-04	ပ	1.23E-04	3	1.37E-04	NA	2 50F+03		ŀ	00.100
Dis(Z-chloroethyl)ether	111-44-4	5.82E-03	υ	5.69E-03	0	5.82E-03	NA	5 85E40A		-	Z.50E+03
phenol	108-95-2	2.19E+03	nc	2.19E+03	n	2.19E+03	NA NA	3 855+04		- +	3.83E+04
z-chlorophenol	95-57-8	1.83E+01	nc	1.83E+01	22	1.83E+01	AN	5.25F+03		- -	3.03E+04
1,3-Ucniorobenzene	541-73-1	3,29E+00	nc	3.29E+00	22	3.29E+00	¥	3.61E+04		- 1-	3.25E+03
1,4-dichlorobenzene	106-46-7	3.06E-01	ပ	2.85E-01	၁	3.06E-01	NA NA	6.61E+05		- -	6.61E+05
hanzul alcohol	95-50-1	2.09E+02	nc	3.29E+01	nc	2.09E+02	¥	3.01E+05		-	3 01F+05
his/2, chloroisonrough of his	9-1-001	1.10E+03	ဍ	1.10E+03	nc	1.10E+03	ΑĀ	5.53E+04		-	5 535+04
2-methylphonol	108-90-1	1.92E-01	ပ	1.79E-01	S	1.92E-01	AA	6.99E+04		-	6.99F+04
havachlorothana	7-04-08	1.83E+02	၁ပ	1.83E+02	nc	1.83E+02	¥	Ϋ́			NA
D-nitroso-di-p-propulamina	67-72-1	4.80E-01	0	4.47E-01	ပ	4.80E-01	¥	2.90E+04		F	2 90F+04
4-methylphanol	021-04-7	9.61E-04	ပ	8.94E-04	O	9.61E-04	Ν	2.00E+02		ŀ	2 00F+02
nitrohenzene	100-44-5	1.83E+02	၁ပ	1.83E+02	ည	1.83E+02	ΑN	¥			AN
Isophorone	70 50 4	Z.09E+00	ည	2.19E+00	20	2.09E+00	NA	1.51E+04		F	1.51E+04
2-nitronhanol	1.02-00	7.00E+00	0	6.59E+00	ပ	7.08E+00	¥N	2.83E+04		-	2.83F+04
	C-C/-90	Y W		NA NA		ΝΑ	NA	NA			NA

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	TEEL	AEGL	Source	¥
		(hg/m³)	(c or nc)	(mg/m³)	(c or nc)	(ng/m³)	(mg/m³)	(na/m³)	(nd/m²)	(T or E)	(ling)
2,4-dimethylphenol	105-67-9	7.30E+01	20	7.30E+01	nc	7.30F+01	NA	NA			1 A 1
bis(2-chloroethoxy)methane	111-91-1	NA		NA		NA	AN	NA			AN SI
2,4-dichlorophenol	120-83-2	1.10E+01	nc	1.10E+01	u	1.10E+01	NA	3 00F+04		-	NA COLLON
1,2,4-trichlorobenzene	120-82-1	2.08E+02	JU	2.08E+02	20	2.08E+02	NA	3 71F+04		- -	3.00E+04
naphthalene	91-20-3	3.13E+00	nc	3.29E+00	nc	3.13E+00	NA	7.86F+04		- +	3.7 IE+04
4-chloroaniline	106-47-8	1.46E+01	nc	1.46E+01	22	1.46E+01	NA	3.00F+04		- -	7.00E+04
hexachlorobutadiene	87-68-3	8.62E-02	၁	8.03E-02	O	8.62E-02	3.21E+04	3.20E+04		- 4	3.00E+04
4-chloro-3-methylphenol	59-50-7	NA		NA N		ΑΝ	WA	2.00F+04		4 E	2.2.1E+04
Z-methylnaphthalene	91-57-6	NA		7.30E+01	ည	7,30E+01	NA	2.00E+04		- -	2.00E+04
nexachlorocyclopentadiene	77-47-4	7.30E-02	nc	7.30E-02	nc	7.30E-02	NA	2.23E+02		- }-	2 235 +07
2,4,6-trichlorophenol	88-06-2	1.10E+02	nc	1.10E+02	nc	1.10E+02	¥	3.00E+04		- -	2.23E+02
z,4,5-trichlorophenol	95-95-4	3.65E+02	nc	3.65E+02	ဥ	3.65E+02	Α	3.00E+04		. -	3.00E+04
z-cnioronaphthalene	91-58-7	2.92E+02	nc	2.92E+02	nc	2.92E+02	¥	6.00E+02		- -	6.00E+02
Z-nitroaniline	88-74-4	2.09E-01	nc	2.08E-01	nc	2.09E-01	ΑN	N N		-	O.OOL.TOZ
Acenaphthylene	208-96-8	NA		ΝΑ		NA	¥	2.00E+02		L	COETO C
dimethylphthalate	131-11-3	3.65E+04	nc	3.65E+04	nc Su	3.65E+04	NA	1.50E+04		- _	1 50E+04
z,6-dinitrotoluene	606-20-2	3,65E+00	nc	3.65E+00	nc	3.65E+00	MA	6.00E+02		- -	A DOE TOT
acenaphthene	83-32-9	2.19E+02	nc	2.19E+02	nc	2.19E+02	NA	1.25F+03		- -	1 255 402
3-ntroantine	99-09-2	NA		NA		NA	NA	ΑN		-	NA NA
Z,4-dinitrophenol	51-28-5	7.30E+00	2	7.30E+00	nc	7.30E+00	¥.	7.50E+03			7 50F+03
uibenzoluran 24 dinitotoluran	132-64-9	1.46E+01	20	1.46E+01	nc	1,46E+01	NA	NA			NA N
7 nitrophogol	121-14-2	7.30E+00	2	7.30E+00	ဥ	7.30E+00	NA	6.00E+02		L	6.00E+02
Fliorene	7-70-001	2.92E+01	2	2.92E+01	ည	2.92E+01		3.00E+04		F	3.00E+04
4-chlorophonyl-phomiothor	700-13-1	1.46E+02	2	1.46E+02	2	1.46E+02		7.50E+04		H	7.50E+04
diethylohthalate	77-cnn	NA		W _N		¥		NA			N
4-nitroaniline	7-00-60	Z.9ZE+U3	nc	2.92E+03	20	2.92E+03	¥	1.50E+04		F	1.50E+04
4 6-dinitro-2-methylphanol	9-10-001	¥ S		¥		NA NA	NA	9.00E+03		F	9.00E+03
n-nitrocodinhemylemine(1)	1-76-466	NA		3.65E-01	2	3.65E-01	ΑA	5.00E+02		-	5.00E+02
4-hromonhand-nhandothor	0-00-00	1.37E+00	ပ	1.28E+00	၁	1.37E+00	¥	NA			ΝΑ
hexachlorobenzene	2-20-101	NA		NA NA		¥ V	Ϋ́	NA			NA
nentachlorophanol	1-4/-011	4.18E-03	O	3.91E-03	O	4.18E-03		7.50E+01		F	7.50E+01
phenanthrene	95 04 9	3.00E-02	o	5.22E-02	٥	5.60E-02		1.50E+03		-	1.50E+03
anthracene	0-10-00	14 40F 100		NA		ΔN		2.00E+03		-	2.00E+03
	120-12-1	1,100,103	20	1.10E+03	٦٢ عد	1.10E+03	Ϋ́	6.00E+03		-	6.00E+03

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Raction 9	Tovicing	Danion 2	Transfer Inch	22.2					
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	加	AEGL	Source	ΔŤV
		(µg/m³)	(c or nc)	(tig/m³)	(c or nc)	(hg/m³)	(µg/m³)	(mg/m³)	(Lid/m ³)	(T or E)	
di-n-butylphthalate	84-74-2	3.65E+02	nc	3.65E+02	nc	3.65E+02	¥	1.50F+04		, -	1 505.00
nuorantnene	206-44-0	1.46E+02	nc	1.46E+02	nc	1.46E+02	M	3.00F+01		- -	1,30E+04
pyrene	129-00-0	1.10E+02	nc	1.10E+02	22	1.10E+02	NA	1.50F+04		- -	3,00E+01
butyibenzyiphthalate	85-68-7	7.30E+02	nc	7.30E+02	20	7.30E+02	NA	5.00E+05		- -	1.30E-104
benzo(a)anthracene	56-55-3	2.17E-02	υ	8.58E-03	ပ	2.17E-02	NA	6 00F+02		- -	3.00E+03
chrysene	218-01-9	2.17E+00	O	8.58E-01	၁	2.17E+00	NA	2 00E+02		- -	9.00E+02
3,3-dichlorobenzidine	91-94-1	1.50E-02	ပ	1.39E-02	0	1.50E-02	¥	6.21F+03		-	4.00E+0Z
DIS(Z-ethylnexyl)phthalate	117-81-7	4.80E-01	ပ	4.47E-01	O	4.80E-01	NA	1 OOF +04		- :	4 00 1 5403
di-n-octylphthalate	117-84-0	7.30E+01	nc	7.30E+01	nc	7.30E+01	AN	1.50E+05		- -	1.00E+04
benzo(b)indolantriene	202-99-2	2.17E-02	ပ	8.58E-03		2.17E-02	NA	ΑN		-	100°
Delizo(k)illuorantnene	207-08-9	2.17E-01	ပ	8.58E-02		2.17E-01	¥	NAN			V V
indexe(1.0.2.d)	50-32-8	2.17E-03	ပ	2.02E-03		2.17E-03	NA NA	7.50E+03		L	7 50E103
illueilo(1,2,3-cd)pyrene	193-39-5	2.17E-02	၁	8.58E-03	ပ	2.17E-02	¥	NA		-	1.00L
henzo(a h Macada	53-70-3	2.17E-03	ပ	8.58E-04	၁	2.17E-03	MA	3.00E+04		L	3 DOF 404
perizo(g,ri,r)peryierre	191-24-2	¥		N N		ΑN	NA N	3.00E+04		 - -	3 00 5 7 0 4
· 1174/ 07 GA										-	3.00E+04
IO-13 (PAHS)											
naphthalene	91-20-3	3.13E+00	nc	3.29E+00	DC	3.13E+00	AN	7 AGE TOA		F	
acenaphthylene	208-96-8	NA		¥		NA	VIV	2 OUE 103		- -	7.86E+04
Acenaphthene	83-32-9	2.19E+02	nc	2.19E+02	Juc Juc	2 19F±02	VIV	4 28E 109		- }	Z.00E+0Z
fluorene	86-73-7	1.46E+02	nc	1.46E+02	20	1 46F±02	VIV	7 505.04		- -	1.25E+03
phenanthrene	85-01-8	NA		NA		NA	S V	2 00 0		- -	7.50E+04
anthracene	120-12-7	1.10E+03	DC	1.10F+03	200	1 10E403	2 4	Z.00E+03		-	2.00E+03
fluoranthene	206-44-0	1.46E+02	uc	1.46E+02	22	1.46E+02	V AN	3 00E+03		- -	6.00E+03
pyrene	129-00-0	1.10E+02	nc	1.10E+02		1.10E+02	NAN	1 50F+04		- -	3.000-101
benzo(a)anthracene	56-55-3	2.17E-02	υ	8.58E-03		2.17E-02	NA	6 00E+02		- +	1.30E+04
chrysene	218-01-9	2.17E+00	ပ	8.58E-01		2.17E+00	ž	2 00F+02		- -	9.00E+02
benzo(b)finoranthene	205-99-2	2.17E-02	O	8.58E-03		2.17E-02	NA	¥N		-	NA MA
Denzo(k)iluoraninene	207-08-9	2.17E-01	ပ	8.58E-02	ပ	2.17E-01	¥	AN			VIV
penzo(e)pyrene	192-97-2	ΑΝ		NA		N A	¥.	AN	¥		NA
perizu(a)pyrene	50-32-8	2.17E-03	ပ	2.02E-03	ပ	2.17E-03	¥	7.50E+03		<u> </u>	7 KOE+03
dibenz(a h)anthraceno	193-39-5	2.17E-02	ပ	8.58E-03	ပ	2.17E-02	¥	¥N Y			NAN
henzo(a h i)pervlene	33-70-3	Z.17E-03	ပ	8.58E-04	v	2.17E-03	MA	3.00E+04			3.00E+04
	181-24-2	¥N		NA NA		NA	NA A	3.00E+04		-	3.00E+04

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Taxicity	Raninn 3	Toylelly						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	五百万	AEGL	Source	ΔŢ
		(hg/m³)	(c or nc)	(trg/m³)	(c.or nc)	(mg/m³)	(m/grl)	(fug/m³)	(mg/m³)	(T or E)	(ma/m ₃)
Dioxins and Furans									Y X		**************************************
2378-Tetrachlorodibenzo-p-dioxin	1746-01-6	4.48E-08	С	4.17E-08	ပ	4.48E-08	NA	3.50E+00		F	3 50E+00
12378-Pentachlorodibenzo-p-dioxin	40321-76-4	NA		ΑN		AN	¥	2.50E+00		- -	2 50E+00
123478-Hexachlorodibenzo-p-dioxin	39227-28-6	NA		N N		ΑN	¥	NA		-	NA NA
123678-Hexachlorodibenzo-p-dioxin	57653-85-7	AN		¥.		WA	¥N	150F+01		L	1 50E±04
123789-Hexachlorodibenzo-p-dioxin	19408-74-3	1.48E-06	ပ	1.38E-06	ပ	1.48E-06	WA	NA		-	NA TO
1234678-Heptachlorodibenzo-p-dioxin	35822-46-9	NA		Ν		ΑN	¥	¥			AM
Octachlorodibenzo(p)dioxin	3268-87-9	NA		NA		ΑN	AN	1.50E+02		-	1 50F+02
2378-1 etrachlorodibenzo-p-furan	51207-31-9	ΑΝ		NA		NA	AA	2.00E+00		-	2.00E+00
12379-Pentachiordalbenzo-p-furan	57117-41-6	ΨN		¥		NA	ΑĀ	¥			NA
422470 H	57117-31-4	ΑΝ		¥		NA	NA	7.50E-02		L	7.50E-02
422679 Hexachiorodipenzo-p-turan	70648-26-9	ΑN		NA NA		NA	NA	7.50E+00			7.50E+00
1230/ 0-nexacilioroulpenzo-p-turan	5/11/-44-9	≨:		NA NA		NA	NA	2.50E+00		Ţ	2.50E+00
234676 II	/2918-21-9	ΝΑ		Ϋ́		NA	ΑN	ΑN			NAN NA
402 407 0-rrexaciliorogioenzo-p-turan	60851-34-5	AN NA		ΑA		A A	Ϋ́	1.50E+00		<u> </u>	1.50F+00
12340/8-Heptachiorodibenzo-p-turan	67562-39-4	ĕ		¥		NA	NA	¥.			N VN
Octobles of the control of the contr	556/3-89-7	NA NA		¥		NA	NA	¥ Y			NA
Cotachiologipenzoluran	39001-02-0	NA		¥		NA	NA	3.00E+02		T	3.00E+02
Nitrobonzono	0 40 00										
2-Nitrofoliono	98-99-3	2.09E+00	nc	2.19E+00	nc	2.09E+00	NA	1.51E+04		T	1.51E+04
3-Mitofolium	2-77-20	3.65E+01	nc	3.65E+01		3.65E+01	NA	NA			¥ A
4-Nitrotoliana	1-90-00	3.65E+01	ဍ	7.30E+01		3.65E+01	₩	NA			W
Nitroglycerine	55-63-0	3.00E+U1	2 6	3.65E+01	2	3.65E+01	≨	3.37E+04		T	3.37E+04
1.3-Dinitrobenzene	00 00	2 GEE 04	ا د	4.470-01	ပ	4.80E-01	¥	δN N			NA NA
2,6-Dinitrotoluene	806-20-2	3.655-01		3.00E-U1	2 2	3.65E-01	¥ :	3.00E+03		L	3.00E+03
2,4-Dinitrotoluene	121-14-2	7 305.100	1	2005-00	2	3.03E+00	₹.	6.00E+02			6.00E+02
1,3,5-Trinitrobenzene	99-35-4	1 10F+02	2 2	1 10E±00		7.30E+00	NA	6.00E+02	ΑN	:-	6.00E+02
2.4.6-Trinitrotofuene	118 08 7	2012000	2 (1.101.702		1.10E+0Z	NA.	3.00E+04		L	3.00E+04
RDX	124 82 4	2.24C-01	ນ (Z.09E-01	ပ	2.24E-01	NA NA	2.50E+04		<u> </u>	2.50E+04
4-Amino-2 6-Dinitrotolijana	10406 64 0	0.11E-02	O	5.69E-02	ပ	6.11E-02	Ϋ́	Ϋ́			NA
2-Amino-2 & Divitrofolione	0-10-00-81	YN S		NA		ΥN	¥	NA			NA
Telry	7-01-71000	NA Postra		NA NA		AN	≨	1.50E+04		-	1.50E+04
HMX	2604 44 0	3.05E+U1	nc	3.65E+01	nc	3.65E+01	¥	NA VA			NA
	7021-41-0	1.83=+02	DC	1.83E+02	nc	1.83E+02	ž	ΥN			ΑN

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity		4,000		4		2
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	TEEL	AEGL	Source	ΑTV
		(m/grl)	(c or nc)	(Lig/m ²)	(c or nc)	(mg/m²)	(mg/m ₃)	(Ling/m³)	(ng/m³)	(E)	(mu/pm)
Pentaerythritoltetranitrate	78-11-5	ΝΑ		NA AN		ž	¥	5.00E+01		-	5 005-101
Dibutyl Phthalate	84-74-2	3.65E+02	nc	3.65E+02	nc	3.65E+02	NA	1.50E+04		-	1.50F+04
Dioctyl Phthalate	117-81-7	4.80E-01	ပ	4.47E-01	S	4.80E-01	NA	1.00E+04		-	1.00F+04
Diphenylamine	122-39-4	9.13E+01	nc	9.13E+01	20	9.13E+01	NA	3.00E+04		-	3 00E+04
Footnotes:				T							0.001
PRG = Preliminary Remediation Goals											
c = cancer											
nc = non-cancer											
RBC = Risk-Based Concentration			,								
HBSL = Health-Based Screening Level											
(E) ERPG = Emergency Response Planning Guidelines	ng Guidelines										
(T) TEEL = Temporary Emergency Exposure Limits	ure Limits	•									
(A) AEGL = Acute Exposure Guideline Level	/el										
ATV = Acute Toxicity Value											
NA = Not Available											

APPENDIX D RISK ASSESSMENT DATA

	ပိ	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun	er Blank,	k, M1A1	fired from t	he M2 Machine	e Gun	
Compound	16 ml m 1	Health-Based	C _{chrontc} /			Acute Toylette		
	Cehronic (Ligim)	("w/brl)	HBSL	× 1~	Cacute (µg/m³)	Value (µg/m³)	Cacute/ ATV	> 12
Permanent Gases								
Ammonia (NH3)	3.00E-01	1 04F+02	2 000		1000			
Carbon Dioxide (CO2)	6.14E+01	NN	Z.00E-U3	2	6.38E+01	1.75E+04	3.65E-03	2
Carbon Monoxide (CO)	5.29E+01	1.00F+04	5 20E 03	<u> </u>	5.22E+04	5.40E+07	9.67E-04	9
Oxides of Nitrogen (as NO)	5.22E-01	1.00F+02	5 22E 03	2 2	1.12E+04	2.30E+05	4.89E-02	ou
Sulfur Dioxide (SO2)	2.25E-02	8.00F+01	2.22E-03	2 2	4.44E+02	3.08E+04	1.44E-02	2
Acid Gases			2.01E-04	2	4.78E+UU	7.89E+02	6.05E-03	no
Hydrogen fluoride	¥	N.		1	414			
Hydrogen chloride	۸	2.08F+01		<u> </u>	AN .	1.60E+03		na
Hydrogen bromide	NA	NV NV		a I	₹	4.50E+03		na
Nitric Acid	¥N.	à À		a I	ΨV	9.93E+03		Вã
Phosphoric acid	AN	1 045.104		na	ΨV	1.30E+03		na
Sulfuric Acid	1 43E-01	1.040.1		na	Δ N	3.00E+03		na
Cyanide	10111	2		na	3.04E+01	2.00E+03	1.52E-02	2
Particulate Cyanide	AN	7 305 104						
Hydrogen Cyanide	3.40F-02	2 425-100	7 00 1	na	Ϋ́	5.00E+03		na
Particulates	20-705-05	3.13E+00	1.09E-02	2	2.89E+01	5.17E+03	5.60E-03	2
Total Suspended Particulate	2 69E+00	E 00E : 04	1					
PM10	3.04E±00	3.00E+01	5.38E-02	٤	5.72E+02	NA		na
PM2.5	2 73F+00	1 50E±04	6.08E-02	2	6.46E+02	NA		na
Metals	200.11	1.305401	1.82E-01	2	5.80E+02	NA		па
Aluminum	5.65E-02	5 11 1 +00	1 105 03	1	100			
Antimony	2.23E-01	1,46E+00	1.13E-02	2 2	4.60E+U1	3.00E+04	1.60E-03	2
Arsenic	¥N	4.47E-04		2 2	NA NA	1.50E+03	1.27E-01	2
Barium	1.32E-01	5.21E-01	2 53F-01	2 2	1 40E 100	3.00E+01		па
Beryllium	¥.	8.00E-04	10 3001	2 2	1. IZETUZ	1.50E+03	7.49E-02	2
Cadmium	¥	1.07E-03		2 2	¥ .	5.00E+00		na
Calcium	1.08E-02	NA NA		<u> </u>	NA POSTI	3.00E+01		na
Chromium	¥	1 53E.04		<u> </u>	9.4ZE+00	3.00E+04	3.07E-04	92
Cobalt	Ą	2 20E+02		<u> </u>	¥.	1.50E+03		g
Copper	3.22E-02	1 46E±02	2 200	g i	¥N.	6.00E+01		В
Lead	3.56E-01	1 50F+00	2.20E-04	2	2.74E+01	3.00E+03	9.12E-03	2
Magnesium	NA	20 20	4.3/E-01	2 2	3.03E+02	1.50E+02	2.02E+00	yes
Manganese	AN AN	5 11E-02		<u> </u>	¥.	3.00E+04		па
		70		<u> </u>	AA A	3.00E+03		na
Risk100m.xls		c C						

	ບື	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	er Blank, I	M1A1	k, M1A1 fired from t DODIC: A559	he M2 Machine	Gun	
Compound	Celironic (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Nickel	ΑN	7.30E+01		na	AN	3 005+03		1
Selenium	NA	1.83E+01		na	NA	A DOE LOS		<u>a</u>
Silver	NA	1.83E+01		na	NA	3 OUE 102		na I
Thallium	W	2.56E-01		2 6	AN	3.00E+02		la la
Vanadium	AN	2.56E+01		2 2	AN	4 FOE 102		a
Zinc	1.44E-02	1.10E+03	1.31E-05	2 2	1 22E±01	3 00E±02	1075.01	na
TO-11 Carbonyls				2	101777	9.000.404	4.U/E-U4	2
Formaldehyde	1.02E-03	1.48E-01	6.91E-03	2	5.06E-01	1 23E+03	A 12E 04	3
Acetaldehyde	NA	8.73E-01		na	NA VA	1 ROF +04	1.125-07	2 2
Acetone	NA	3.65E+02		па	NA	2.37E+06		2 2
Acrolein	Α¥	2.09E-02		na	ΑN	2.30F+02		2 2
Proprionaldehyde	NA	NV		E	NA VA	7.50E+04		<u> </u>
Crotonaldehyde	NA	3.54E-03		na	NA	5 72E±03		<u> </u>
Butyraldehyde	AN	N		E	¥	7.38F+04		<u> </u>
Benzaldehyde	NA	3.65E+02		na	NA A	1.50F+04		0 5
Isovaleraldehyde	NA NA	N		na	¥	AN		2 2
Valeraldehyde	۸	NV		па	ΑN	AN		2 2
o,m,p-Tolualdehyde	NA	N		na	¥	NA		2 2
Hexaldehyde	NA	NV		па	₹N	AN		2 2
2,5-Dimethylbenzaldehyde	NA	N/		na	¥	NA		2 2
VOCS								1
Propene	9.19E-04	NV		g	1.95E-01	NA NA		g
Ulchlorodifluoromethane	3.31E-05	2.09E+02	1.59E-07	2	2.82E-02	1.48E+07	1.90E-09	2 2
Chlorodifiuoromethane	YA.	5.11E+04		па	NA	4.41E+06		na E
Chloromothana	NA	AN.		na	NA	2.10E+07		na
Vind Objeids	0.41E-U5	1.07E+00	6.00E-05	2	1.27E-01	2.06E+05	6.17E-07	2
1.3 Butodian	Y S	2.20E-02		В	NA	1.28E+04		Вa
allament Demond	¥N.	3.74E-03		na	NA	2.20E+04		g
Chicago	Ψ.	5.21E+00		na	NA	5.82E+04		Ba
Dichlorofficerane	ΨN.	2.32E+00		na	NA	2.64E+06		a
Trichlorofficement	NA NA	2.09E+02		na	NA	1.48E+07		na
Pontana	CO-300.1	7.30E+02	2.58E-08	2	1.60E-02	2.81E+06	5.71E-09	2
Acrolein	4 00E 03	NA NO 100 G		па	ΑA	1.80E+06		na
	1.00003	Z.USE-UZ	4.80E-02	2	2.13E-01	2.30E+02	9.26E-04	2

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100 meter location

	ပိ	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun	er Blank, I	M1A1	fired from t	he M2 Machine	Gun	
			20	בים	A559			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chrontc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
1,1-Dichloroethene	Ν	5.21E+02		na	AN	7 025404		
Freon 113	NA	3.13E+04		na	NA	0 58E108		Ja
Acetone	1.21E-02	3.65E+02	3.32E-05	2	1 03F+01	9.30E+00	1 245 00	na
Methyl lodide	AN	≥		2 2	NA	4.57E+00	4.34E-Ub	2
Carbon Disulfide	NA	7.30E+02		2 2	ΔN	2 445.04		na
Acetonitrile	5.69E-04	6.20E+01	9.17E-06	2	4 84E-04	3.11E+04	20 100 1	na
3-Chloropropene	NA	1.04E+00		2	AN	0 305+03	4.80E-U6	2
Methylene Chloride	2.36E-03	4.09E+00	5.77E-04	2	1.17F+00	8.03E+03	4 697 00	na I
tert-Butyl Alcohol	AN	≥N		2	NAM	4 65E±0E	1.00E-U0	2
Acrylonitrile	8.57E-05	2.83E-02	3.03E-03	2 2	4 25E 02	4.335403	20 200	na
trans-1,2-Dichloroethene	ΑΝ	7.30F+01		2 2	7.501-02	4.17E+04	1.96E-06	2
Methyl t-Butyl Ether	ΝΑ	3.13E+03		0 0	Z S	4.95E+04		na
Hexane	7.43E-03	2 09F+02	3 58E 06	2 2	YN 60	4.32E+05		na
1,1-Dichloroethane	NA W	5 21E+02	0.00	2 2	0.325+00	5.28E+05	1.20E-05	ou
Vinyl Acetate	NA	200000		<u> </u>	¥.	1.21E+06		na
cis-1.2-Dichloroethene	NA NA	2.095.102		na	NA	1.92E+04		na
2-Butanone		3.035+01		Ba	WA	7.92E+05		na
Ethyl Acetate	Ç V	1.04E+03		na	AN	8.85E+05		na
Methyl Acrylate		3.28E+U3		па	NA	1.44E+06		na
Chloroform	\$ \$2	1.10E+02		na	X A	NA		na
1.1.1-Trichloroethane	₹ Ş	4.045.02		g	NA A	9.76E+03		g
Carbon Tetrachloride	\$ \$	1.04E+03		na	₹	1.94E+06		na
1.2-Dichlornethane	Z S	1.28E-U1		g	AN A	1.28E+05		æ
Benzene	2 90E-03	7 .39E-02	4 401	g	ΨV	8.08E+03		Вã
Isooctane (2,2,4-trimethylpentane)	NA AN		1.10E-02	2	1.44E+00	1.56E+05	9.22E-06	no
Heptane	AN			g :	¥.	3.50E+05		na
Trichloroethane	MA	1 045+02		<u> </u>	¥.	1.80E+06		na
Ethyl Acrylate	ΔN	1 40E 04		g	¥.	1.94E+06		na
1.2-Dichloropropane	2 2	1.40E-01		na	₹	6.14E+04		na
Methyl Methaciviate		9.09E-02		g	NA	5.08E+05		na
Dibromomethane	V	7.30E+02		2	AN	4.09E+05		na
1.4-Dioxana	V	3.03E+U1		na	AA A	2.50E+05		na
Bromodichloromothane	X < 2	0.11E-U1		na	AA	9.00E+04		na
4-Methyl-2-Pentanone	X	1.08E-01		na	NA V	4.00E+03		na
Superior Sup	¥N.	8.34E+01		na	A V	3.07E+05		9

D-4

	වී	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	er Blank, N DO	k, M1A1 DODIC:	fired from the A559	า e M2 Machi ne	Gun	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Toluene	3.65E-04	4.02E+02	9.10E-07	2	7.77E-02	1 88F+05	4 14E-07	5
Octane	NA	N/		па	NA NA	NA	10 71 11	2 2
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA NA	AN		2 2
Ethyl Methacrylate	NA	3.29E+02		g	¥	AN A		2 2
1,1,2-Trichloroethane	NA	1.20E-01		Бã	ΑN	1.64E+05		2 2
Tetrachloroethene	Š	3.31E+00		па	ΑN	6.78E+05		2 2
2-Hexanone	ΑĀ	5.11E+00		na	NA NA	4.09E+04		Ba
Dibromochloromethane	ΑN	8.00E-02		na	ΑN	6.00E+03		E
1,2-Dibromoethane	WA	8.73E-03		na	NA	1.54E+05		na
Chlorobenzene	NA.	6.21E+01		na	NA	1.38E+05		na
1, 1, 1, 2-1 etrachloroethane	¥N.	2.60E-01		na	NA	5.15E+04		na
Ethylbenzene	AN.	1.06E+03		na	NA	5.43E+05		na
m&p-Xylene	2.55E-04	7.30E+02	3.49E-07	no	2.17E-01	6.51E+05	3.33E-07	2
o-Xylene	AN S	7.30E+02		na	NA	6.51E+05		na
Styrene	2.50E-04	1.06E+03	2.36E-07	٤	5.32E-02	2.13E+05	2.50E-07	2
Bromoform	¥	1.75E+00		na	NA	6.20E+03		БП
Cumene	¥.	4.02E+02		na	NA	2.46E+05		na
1, 1, 2, 2-1 etrachioroethane	¥.	3.31E-02		В	NA	2.06E+04		na
1,2,3-1 richioropropane	¥.	9.61E-04		na	NA	6.03E+04		g
Dromobenzene A Edunkali	Y S	1.04E+01		ш	NA	4.82E+04		na
1 3 5. Trimethylbonzono	¥2	NV		g	¥	1.25E+05		na
Alpha Methyl Styrene	¥ \	0.212+00		g E	¥.	3.68E+05		na
1.2.4-Trimethylhenzene	S	2.30E±02		g	¥	WA		na
1.3-Dichlorobenzene	AN	3.20E±00		E	¥.	1.80E+05		na
1,4-Dichlorobenzene	AN	3.25E-100		<u>a</u>	¥ S	3.61E+04		na
Benzyl Chloride	ΔN	3 ORE 03		<u> </u>	¥N.	6.61E+05		na
1.2-Dichlorobenzene	S N	3.30E-02		<u>a</u>	AN :	5.20E+03		na
Hoverhordhord	5	Z.U8ETUZ		na L	¥N	3.01E+05		na
1 2 4. Trichlorobourge	YN S	4.80E-01		g	NA	2.90E+04		na
ייביידי ווכוווטו מחפוובפוופ	AN :	2.08E+02		na	NA	3.71E+04		na
nexacriorobutadiene	Ϋ́	8.73E-02		na	NA	3.21E+04		na
I. I. december 1								
Hydrocarbons								
Wethane	1.08E-01	N		па	9.21E+01	3.30E+06	2.79E-05	2

1/18/01

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values -100 meter location

	Ca	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	er Blank, I DC	M1A1	k, M1A1 fired from ti DODIC: A559	ne M2 Machine	Gun	
Compound	C _{chronte} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Ethylene	1.08E-02	N		na	9.21E+00	4 ROF+05	מ שטע כ	
Acetylene	5.82E-03	N N		E	1.24E+00	NA NA	Z.UUE-UD	2
Ethane	AN	N<		na	NA WA	AN		la !
Propylene	NA	≥N		g	AN	C VI		na
Propane	NA	N		Ē	¥	3 78F±08		g g
Propyne (methyl acetylene)	ΔA	NV		na	¥	2.79F+06		<u> </u>
Isobutane	ΑN	NV		па	¥	9.52E+05		2 2
1-Butene/Isobutylene (115-11-7)	AA	NV		na	ž	6.87E+06		<u> </u>
1,3-Butadiene/butane	NA	3.74E-03		E	ž	2.20F±04		<u> </u>
cis-butene	NA	NV		ВП	¥.	1.72F+04		<u> </u>
1-Butyne	A	N		20	AM	NA		<u>a</u>
trans-Butene	NA	N		2	AN	1 72E±04		a !
2-Butyne (crotonylene)	NA	N		2	ΔN	1.7 ZL-TU4		e
n-Pentane	AN	N		2	ΔN	1 00E		na
n-Hexane	8.30E-03	2 10F±02	2 OKE OK	2 2	00.7007	1.80E+U0		na
SVOCs		1:10	0.301-103	2	1.00=±00	5.28E+05	1.34E-05	2
n-nitrosodimethylamine	ΑN	1.37E-04		2	ΔN	2 500 103		
bis(2-chloroethyl)ether	¥N N	5.82E-03		2 2	5 5	Z.30E+03		gu
phenol	¥	2.19E+03		2 2	Ç A	0.0000404		na
2-chlorophenol	ΑN	1.83E+01		2 2	Ç A	3.03E+04		na
1,3-Dichlorobenzene	¥	3.29E+00		2 6	S N	0.200703		<u>na</u>
1,4-dichlorobenzene	ΑN	3.06E-01		2 2	Z V	9.010704		na
1,2-dichlorobenzene	Ϋ́	2.09E+02		2 2	AN	9 04 11 05		па
benzyl alcohol	ΨN	1.10E+03		2 2	AN	5.010103		na L
bis(2-chloroisopropyl)ether	NA	1.92E-01		na	AN	6 90E+04		<u>a</u>
2-methylphenol	NA	1.83E+02		20	AM	O.SSL 104		la
hexachloroethane	NA	4.80E-01		2	ΔN	2 00 E		g
n-nitroso-di-n-propylamine	Ą	9.61E-04		2	S N	2.005.04		g
4-methylphenol	A W	1.83E+02		2 2	<u> </u>	Z.UUE+UZ		Ва
nitrobenzene	Ą	2 09E+00		0 9	Z .	ΑN		na
isophorone	AN	7 08E400		<u> </u>	¥.	1.51E+04		na
2-nitrophenol	AN	NN/		e :	₹.	2.83E+04		na
2,4-dimethylphenol	ΝΔΝ	7 205 104		g	NA	A A		na
bis(2-chloroethoxy)methane	ΔN	NN NN		na L	¥	NA		na
	LINI	NA NA		na	NA	NA		EC

	ပို့	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	er Blank, I DC	k, M1A1 fired DODIC: A559	fired from th A559	ne M2 Machine	Gun	1 1 1 21 1
C _{chronte} (µg/m³)	- C	Health-Based Screening Level (µg/m³)	C _{chrontc} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
AN		1.10E+01		na	AN	3.00E+04		2
NA		2.08E+02		na	۷	3.71E+04		2
8.90E-04		3.13E+00	2.85E-04	no	7.57E-01	7.86E+04	9.63E-06	2
₩		1.46E+01		na	NA	3.00E+04		E
NA		8.62E-02		na	NA	3.21E+04		na
¥ S		N S		В	NA	2.00E+04		ВE
¥ ×		7.30E+01		na	NA A	2.00E+04		na
¥ 2	1	7.30E-02		na	A A	2.23E+02		na
X S		1.10E+02		ē	¥N.	3.00E+04		na
ΔN		3.03E+02		a	¥.	3.00E+04		na
Y Y		2.92E+02		E S	¥ S	6.00E+02		na
AN N		N N		<u> </u>	X S	NA		na
NA		3.65E+04		2 2	Z V	2.00E+02		na
NA		3.65E+00		g	Ž	6.00F+02		<u>a</u> 2
NA		2.19E+02		na	¥N	1.25E+03		2 2
₹	- 1	N		na	AA	NA		E E
Y S	- 1	7.30E+00		g	NA	7.50E+03		па
ZN VN		1.40E+U1		ē	∀ N	¥		na
AN		2 02E+01		na Z	ΨN.	6.00E+02		na
AA		1 46E±02			Y S	3.00E+04		na
NA NA		NN NN		2 2	ΨN V	7.50E+04		g
NA		2.92E+03		2	ΑN	1 50F+04		<u>a</u>
NA		NV		na	AA	9.00E+03		2 2
¥		3.65E-01		na	NA NA	5.00E+02		2 2
¥.		1.37E+00		na	NA	NA		g e
AA .		≥		na	AN	AN		na
¥.		4.18E-03		na	NA	7.50E+01		E E
AN :	- 1	5.60E-02		na	NA	1.50E+03		na
¥.	- 1	2		na	NA	2.00E+03		na na
Y S	- 1	1.10E+03		na	NA	6.00E+03		E
¥ Z		3.65E+02		na	NA AN	1.50E+04		g
¥N		1.46E+02		na	NA	3.00E+01		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100 meter location

	Ca	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	r Blank, N DO	k, M1A1 fired DODIC: A559	fired from th A559	ne M2 Machine	Gun	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
pyrene	Ą	1.10E+02		na	NA	1.50E+04		na
butylbenzylphthalate	ΑN	7.30E+02		na	NA	5.00E+05		na
benzo(a)anthracene	ΝΑ	2.17E-02		na	NA	6.00E+02		na
chrysene	ΝΑ	2.17E+00		na	NA	2.00E+02		na
3,3-dichlorobenzidine	ΝA	1.50E-02		na	NA NA	6.21E+03		na
bis(2-ethylhexyl)phthalate	۸A	4.80E-01		na	NA A	1.00E+04		na
di-n-octylphthalate	¥	7.30E+01		na	NA	1.50E+05		na
benzo(b)fluoranthene	NA	2.17E-02		na	NA	AN		na
benzo(k)fluoranthene	ΑN	2.17E-01		na	NA	WA		na
benzo(a)pyrene	ΑN	2.17E-03		na	NA	7.50E+03		na
indeno(1,2,3-cd)pyrene	ΑN	2.17E-02		na	NA	NA		na
dibenz(a,h)anthracene	AN	2.17E-03		ua	NA	3.00E+04		na
benzo(g,h,i)perylene	ΝΑ	N		na	NA	3.00E+04		na
TO-13 (PAHs)								
naphthalene	3.96E-04	3.13E+00	1.27E-04	ou	3.37E-01	7.86E+04	4.29E-06	ou
acenaphthylene	1.56E-05	NV		na	1.33E-02	2.00E+02	6.63E-05	ou
Acenaphthene	1.84E-06	2.19E+02	8.39E-09	2	1.56E-03	1.25E+03	1.25E-06	no
fluorene	4.79E-06	1.46E+02	3.28E-08	2	4.08E-03	7.50E+04	5.44E-08	no
phenanthrene	4.08E-06	N/		na	3.47E-03	2.00E+03	1.74E-06	ou
anthracene	NA	1.10E+03		na	۸A	6.00E+03		na
fluoranthene	5.23E-06	1.46E+02	3.58E-08	2	4.45E-03	3.00E+01	1.48E-04	2
pyrene	4.97E-06	1.10E+02	4.54E-08	2	4.23E-03	1.50E+04	2.82E-07	2
benzo(a)anthracene	NA	2.17E-02		ē	NA	6.00E+02		na
chrysene	NA	2.17E+00		Б	NA	2.00E+02		na
benzo(b)fluoranthene	NA	2.17E-02		na	NA	NA		na
benzo(k)fluoranthene	NA	2.17E-01		na	NA	NA		na
Benzo(e)pyrene	AN A	۸N		na	NA	AN		na
benzo(a)pyrene	NA	2.17E-03		g	AN	7.50E+03		na
indeno(1,2,3-cd)pyrene	NA	2.17E-02		g	NA A	₹		na
dibenz(a,h)anthracene	NA	2.17E-03		na	ΝΑ	3.00E+04		na
benzo(g,h,i)perylene	NA	⋛		2	ΔN	3.00E+04		ē
Dioxins and Furans								
2378-Tetrachlorodibenzo-p-dioxin	AN	4.48E-08		na	AN	3.50E+00		na

	В О	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	er Blank, N DO	k, M1A1 DODIC:	fired from the A559	he M2 Machine	Gun e	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
12378-Pentachlorodibenzo-p-dioxin	NA	NV		na	ΨN	2.50E+00		na Br
123478-Hexachlorodibenzo-p-dloxin	NA	NV		ē	ΨZ	ΑN		eu
123678-Hexachlorodibenzo-p-dioxin	NA	N		na	ΝΑ	1.50E+01		2
123789-Hexachlorodibenzo-p-dioxin	NA	1.48E-06		na	ΑN	NA		2 2
1234678-Heptachlorodibenzo-p-dioxin	1.49E-10	NV		na	3.18E-08	AA A		E
Octachlorodibenzo(p)dioxin	2.68E-09	۸N		na	2.28E-06	1.50E+02	1.52E-08	2
2378-Tetrachlorodibenzo-p-furan	NA	NV		na	ΑN	2.00E+00		E
12378-Pentachlorodibenzo-p-furan	¥.	N\		na	NA	AN		Ē
23478-Pentachlorodibenzo-o-furan	AA	N		na	Ϋ́	7.50E-02		na
123478-Hexachlorodibenzo-p-furan	NA	NV		na	NA	7.50E+00		E
123678-Hexachlorodibenzo-p-furan	NA	N		na	NA	2.50E+00		na
123789-Hexachlorodibenzo-p-furan	NA	NV		na	ΑN	AN A		e
234678-Hexachlorodibenzo-p-furan	NA	N		na	Ϋ́Α	1.50E+00		8
1234678-Heptachlorodibenzo-p-furan	2.86E-11	NV		па	6.08E-09	NA		a
1234789-Heptachlorodibenzo-p-furan	ΝΑ	NV		na	¥	NA		e
Octachlorodibenzofuran	4.34E-10	NV		па	3.69E-07	3.00E+02	1.23E-09	2
Energetics								
Nitrobenzene	NA AA	2.09E+00		ē	AN AN	1.51E+04		g
2-Nitrotoluene	NA NA	3.65E+01		ā	ΑN	NA		2
3-Nitrotoluene	NA AA	3.65E+01		na	NA	AN		БE
4-Nitrotoluene	¥	3.65E+01		na	NA	3.37E+04		æ
Nitroglycerine	¥	4.80E-01		na	NA	NA		Ba
1,3-Dinitrobenzene	¥	3.65E-01		В	۸	3.00E+03		na
Z,6-Uinitrotoluene	¥N.	3.65E+00		na	¥	6.00E+02		na
2,4-Uinitrotoluene	¥N.	7.30E+00		na	¥	6.00E+02		na
1,3,5-I rinitrobenzene	¥.	1.10E+02		na	ΑN	3.00E+04		na
2,4,6-I rinitrotoluene	¥.	2.24E-01		g	NA	2.50E+04		na
RDX	NA	6.11E-02		na	NA	AN		na
4-Amino-2,6-Dinitrotoluene	ΑN	N		na	NA	NA		na
2-Amino-2,6-Dinitrotoluene	¥	2		na	AN	1.50E+04		na
Tetryl	¥N.	3.65E+01		na	ΑΝ	NA		na
HMX	¥N.	1.83E+02		na	NA	NA		na
Pentaerythritoltetranitrate	¥.	N/		E	₹	5.00E+01		na
Unutyi Prithalate	NA	3.65E+02		na	ΑΝ	1.50E+04		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100 meter location

	ပိ	Cartridge, .50 callber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	ar Blank, I DO	M1A1 DIC:	k, M1A1 fired from th DODIC: A559	ıе M2 Machine	Gun	
Compound	C _{chronte} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Cacute (µg/m³) Value (µg/m³) Cacute/ ATV > 1?	Cacute/ ATV	> 1?
Diochyl Dathelete	V 1 4	70 200 7		I				
Diociyi Filifiafate	¥	4.80E-01		n B	¥	1.00E+04		20
Diphenylamine	¥	9.13E+01		na	AN	3 00F+04		
						0.100.0		<u></u>

Footnotes:

NA = Not applicable because compound was not detected NV = No value available

C_{chronic} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

>1? = Is the ratio greater than one?

na = Not available because health-based sceening value is not available or not applicable if compound was not detected Cacuto = average acute concentration

ATV = Acute toxicity value

D-10

Table D-2: Comparison of Modeled Air Concentrations with Health-Based Values: Total Petroleum Hydrocarbons - 100 meter location

	Cartridge, .50 c	aliber Blank, M1A DODIC	Cartridge, .50 caliber Blank, M1A1 fired from the M2 Machine Gun DODIC: A559	12 Machine Gun
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronte} (µg/m³)
	Aliohatic:C<=8	Alinhatic:C>8	0-70.vjjemo4V	
Hexane	7.43E-03	NA	NA	Aromatic: C>0
Benzene	NA	NA	6.77E-03	AN
Toluene	NA	NA	3.65E-04	AN
m&p-Xylene	NA	NA	2.55E-04	NA
Styrene	NA	NA	NA	2.50E-04
n-Hexane	8.30E-03	NA	AN	NA
naphthalene	NA	NA	AN	8.90E-04
naphthalene	NA	NA	AN	3.96E-04
acenaphthylene	NA	NA	NA	1.56E-05
Acenaphthene	NA	AN	NA NA	1.84E-06
fluorene	NA	NA	AN	4.79E-06
phenanthrene	NA	Ϋ́Α	AN	4.08E-06
fluoranthene	NA	NA	٩N	5.23E-06
	1.57E-02	0.00E+00	7.39E-03	1.57E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
Cehronic/HBSL	8.20E-07	0.00E+00	1.77E-05	7.52E-06
>19	01	no	ou	
Footnotes: >1? = Is the ratio greater than one? NA = Not applicable because compound was not detected C _{chronic} = chronic time-averaged concentration HBSL = Chronic health-based screening level				

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

		Cartrid	lge, 0.50 c DC	all ber	Cartridge, 0.50 caliber, Blank, M1A1 (M2) DODIC: A559	41 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Permanent Gases								
Ammonia (NH3)	1.26E-01	1.04E+02	1.21E-03	92	2.68E+01	1.75E+04	1 53E.03	2
Carbon Dioxide (CO2)	2.58E+01	N		БE	2.19E+04	5,40E+07	4.06F-04	2 2
Carbon Monoxide (CO)	2.22E+01	1.00E+04	2.22E-03	ou	4.72E+03	2.30E+05	2 05E-02	2 2
Oxides of Nitrogen (as NO)	2.19E-01	1.00E+02	2.19E-03	ou	1.87E+02	3.08E+04	6 07E-03	2 2
Sulfur Dioxide (SO2)	9.44E-03	8.00E+01	1.18E-04	ou	2.01E+00	7.89E+02	2.54E-03	2 2
Acid Gases								
Hydrogen fluoride	NA	N		па	WA	1.60E+03		60
Hydrogen chloride	NA	2.08E+01		Б	NA	4.50E+03		2 2
Hydrogen bromide	NA	N/		na	W	9 93F+03		2 2
Nitric Acid	NA	N		па	¥	1.30E+03		פ
Phosphoric acid	NA	1.04E+01		na	Ą	3 00F+03		2 2
Sulfuric Acid	6.01E-02	N		na	1.28E+01	2 00E+03	8 30E 03	2
Cyanide						20.120.12	0.381-03	2
Particulate Cyanide	¥	7.30E+01		E	AN	5 00E+03		2
Hydrogen Cyanide	1.43E-02	3.13E+00	4.57E-03	2	1.21E+01	5.17F+03	2 355-03	2
Particulates							2:001	2
Total Suspended Particulate	1.13E+00	5.00E+01	2.26E-02	2	2.40E+02	NA		3
PM10	1.28E+00	5.00E+01	2.55E-02	2	2.71E+02	NA		<u> </u>
PM2.5	1.15E+00	1.50E+01	7.64E-02	2	2.44E+02	NA		2 6
Metals								
Aluminum	2.37E-02	5.11E+00	4.64E-03	no	2.02E+01	3.00E+04	6.72E-04	02
Antimony	9.37E-02	1.46E+00	6.42E-02	no	7.97E+01	1.50E+03	5.31E-02	2
Arsenic	NA NA	4.47E-04		na	NA	3.00E+01		na
Barium	5.55E-02	5.21E-01	1.06E-01	uo	4.72E+01	1.50E+03	3.15E-02	20
Beryllium	ΑN	8.00E-04		na	ΑN	5.00E+00		na
Cadmium	ΑN	1.07E-03		na	ΝΑ	3.00E+01		na
Calcium	4.55E-03	NV		na	3.87E+00	3.00E+04	1.29E-04	2
Chromium	ΑN	1.53E-04		na	ΑN	1.50E+03		e c
Cobalt	NA	2.20E+02		na	AN	6.00E+01		na
Copper	1.35E-02	1.46E+02	9.25E-05	92	1.15E+01	3.00E+03	3.83E-03	20
Lead	1.50E-U1	1.50E+00	9.97E-02	2	1.27E+02	1.50E+02	8.48E-01	2

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

		Cartric	lge, 0.50 c	alibe DIC:	Cartridge, 0.50 callber, Blank, M1A1 (M2) DODIC: A559	41 (M2)		
Compound	C _{chronte} (µg/m³)	Health-Based Screening Level (µg/m³)	Cehronic/ HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
Magnesium	NA	۸N		na	AN	3.00E+04		2
Manganese	NA	5.11E-02		na	NA	3.00E+03		2 2
Nickel	NA	7.30E+01		na	Ν	3.00E+03		2
Selenium	NA	1.83E+01		na	NA	6.00E+02		2 6
Silver	NA	1.83E+01		na	NA	3.00E+02		3 0
Thallium	NA NA	2.56E-01		na	NA	3.00E+02		2 0
Vanadium	A N	2.56E+01		na	NA	1.50E+02		2
Zinc	6.03E-03	1.10E+03	5.51E-06	no	5.13E+00	3.00E+04	1.71E-04	2
TO-11 Carbonyls			·					
Formaldehyde	4.29E-04	1.48E-01	2.90E-03	2	2.13E-01	1.23E+03	1.73E-04	٤
Acetaldehyde	ΑN	8.73E-01		na	N A	1.80E+04		na
Acetone	NA	3.65E+02		na	NA.	2.37E+06		E
Acrolein	ΨX	2.09E-02		na	AN	2.30E+02		na
Proprionaldehyde	NA	N		na	AN	7.50E+04		g
Crotonaldehyde	۸	3.54E-03		na	AN	5.72E+03		na
Butyraldehyde	ΑN	2		na	NA	7.38E+04		na
Benzaidenyde	AA .	3.65E+02		na	NA	1.50E+04		na
Isovaleraldenyde	AN .	2		Б	NA	NA		na
Valeraueriyae	AA.	N/		Ē	ΝΑ	NA		па
O,III,p-10iualdenyde	AN S	2		g	NA	NA		na
2 5. Dimethyllhenzeldehude	¥ × ×	2		ē	ΨZ	NA		na
VOCs	(2)	2		na	AA	V		na
Propene	3.86E-04	N		na	8.20E-02	MA		2
Dichlorodifluoromethane	1.39E-05	2.09E+02	6.67E-08	2	1.18E-02	1.48E+07	7 98F-10	E S
Chlorodifluoromethane	ΝΑ	5.11E+04		Ba	ΝΑ	4.41E+06		2 2
Freon 114	NA	NV		na	NA	2.10E+07		E
Chloromethane	2.69E-05	1.07E+00	2.52E-05	no	5.34E-02	2.06E+05	2.59E-07	2
Vinyl Chloride	ΨN	2.20E-02		na	ΝA	1.28E+04		na
1,3-Butadiene	¥N.	3.74E-03		na	NA	2.20E+04		na
Bromomethane	AN S	5.21E+00		g	NA	5.82E+04		na
Cillordetnane	NA	2.32E+00		na	AA	2.64E+06		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

		Cartrid	lge, 0.50 c	allber DIC:	Cartridge, 0.50 caliber, Blank, M1A1 (M2) DODIC: A559	A1 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronte} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
Dichlorofluoromethane	ΑN	2.09E+02		na	ΑN	1.48E+07		na
Trichlorofluoromethane	7.90E-06	7.30E+02	1.08E-08	2	6.72E-03	2.81E+06	2.40E-09	2
Pentane	NA	AN.		na	NA	1.80E+06		2
Acrolein	4.21E-04	2.09E-02	2.02E-02	2	8.95E-02	2.30E+02	3.89E-04	2 2
1,1-Dichloroethene	NA	5.21E+02		na	ΑN	7.92E+04		e c
Freon 113	NA	3.13E+04		па	ΑN	9.58E+06		Pa
Acetone	5.08E-03	3.65E+02	1.39E-05	စူ	4.32E+00	2.37E+06	1.82E-06	2
Methyl lodide	N N	NV		na	MA	1.45E+05		na
Carbon Disulfide	¥	7.30E+02		æ	¥	3.11E+04		na
Acetonitrile	2.39E-04	6.20E+01	3.85E-06	2	2.03E-01	1.01E+05	2.01E-06	2
3-Chloropropene	¥.	1.04E+00		na	ΝΑ	9.39E+03		na
Methylene Chloride	9.91E-04	4.09E+00	2.42E-04	2	4.92E-01	6.96E+05	7.06E-07	2
tert-Butyl Alcohol	AN N	N/		na	NA	4.55E+05		na
Acrylonitrile	3.60E-05	2.83E-02	1.27E-03	9	1.79E-02	2.17E+04	8.23E-07	2
trans-1,2-Dichloroethene	AN.	7.30E+01		na	NA	4.95E+04		na
Methyl t-Butyl Ether	¥	3.13E+03		na	NA	4.32E+05		na
Hexane	3.12E-03	2.09E+02	1.50E-05	2	2.65E+00	5.28E+05	5.02E-06	ou
1,1-Dichloroethane	¥	5.21E+02		na	AN	1.21E+06		na
Vinyl Acetate	NA NA	2.09E+02		na	NA	1.92E+04		na
cis-1,2-Dichloroethene	¥N	3.65E+01		na	NA	7.92E+05		na
2-Butanone	AN .	1.04E+03		па	NA	8.85E+05		na
Ethyl Acetate	¥.	3.29E+03		E	NA	1.44E+06		na
Metnyl Acrylate	¥.	1.10E+02		na	NA	NA		na
Chloroform	Ϋ́	8.35E-02		na	NA	9.76E+03		na
1,1,1-Trichloroethane	¥	1.04E+03		na	NA	1.94E+06		na
Carbon Tetrachloride	ΑΝ	1.28E-01		na	NA	1.28E+05		na
1,2-Dichloroethane	ΨN	7.39E-02		na	NA	8.08E+03		na
Benzene	1.22E-03	2.49E-01	4.89E-03	2	6.04E-01	1.56E+05	3.87E-06	2
Isooctane (2,2,4-trimethylpentane)	¥.	· N		g	NA	3.50E+05		na
Heptane	NA NA	N/		na	NA	1.80E+06		na
Trichloroethane	AN:	1.04E+03		na	NA	1.94E+06		na
Etnyl Acrylate	NA	1.40E-01		na	NA	6.14E+04		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

		Cartrio	lge, 0.50 c DC	0 caliber, Blar DODIC: A559	Cartridge, 0.50 caliber, Blank, M1A1 (M2) DODIC: A559	A1 (M2)		
Compound	· C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
1,2-Dichloropropane	AN	9.89E-02		na	ΑN	5.08E+05		2
Methyl Methacrylate	NA	7.30E+02		na	ΑA	4.09E+05		2 2
Dibromomethane	¥.	3.65E+01		na	NA A	2.50E+05		2 2
1,4-Dioxane	NA A	6.11E-01		na	¥	9.00F+04		2 2
Bromodichloromethane	NA	1.08E-01		g	AA	4.00E+03		2 2
4-Methyl-2-Pentanone	NA	8.34E+01		ВП	AN	3.07E+05		2 2
Toluene	1.53E-04	4.02E+02	3.82E-07	2	3.26E-02	1.88E+05	1.74E-07	2
Octane	W	NV		na	ΑN	NA		2 6
trans-1,3-Dichloropropene	NA	5.17E-02		na	ΨN	AN		2 6
Ethyl Wethacrylate	WA	3.29E+02		na	NA	AN		2 6
1,1,2-1 richioroethane	ΑΝ	1.20E-01		na	AN	1.64E+05	,	na Pa
Tetrachioroethene	ΑA	3.31E+00		na	NA	6.78E+05		200
Z-Hexanone	AN.	5.11E+00		na	NA	4.09E+04		Ba
Justinochioromethane	ΝA	8.00E-02		na	NA	6.00E+03		Ba
1,z~Dibioindemane	NA	8.73E-03		na	N A A	1.54E+05		na Eu
Chlorobenzene	ΑΝ	6.21E+01		na	NA	1.38E+05		Ball
1, 1, 2-1 etrachioroethane	¥	2.60E-01		na	NA	5.15E+04		Ba
Eurybenzene	AN S	1.06E+03		na	NA	5.43E+05		na
eliap-Aylene Aylono	1.0/E-04	7.30E+02	1.47E-07	2	9.10E-02	6.51E+05	1.40E-07	2
Shrana	NA April 03	7.30E+02		g	AA	6.51E+05		na
Bromoform	NA	1.06E+03	9.92E-08	2	2.23E-02	2.13E+05	1.05E-07	2
Cumene	ΔN	A 02E±02		<u> </u>	¥2	6.20E+03		na
1,1,2,2-Tetrachloroethane	ΨN	3 345.02		<u> </u>	Y S	2.46E+05		na
1,2,3-Trichloropropane	ΔN	0.011.02		<u> </u>	¥	2.06E+04		na
Bromobenzene	ĄN	1.04E±01		2 2	¥ \$	6.03E+04		na
4-Ethyltoluene	AN	NIV.		<u> </u>	X	4.82E+04		na
1,3,5-Trimethylbenzene	AM	A 21E ±00		a g	¥ S	1.25E+05		na
Alpha Methyl Styrene	AN	2 56F±02		<u> </u>	¥ S	3.68E+05		na
1.2.4-Trimethylbenzene	ΝΑΝ	8 24E100		<u> </u>	¥.	NA		na
1,3-Dichlorobenzene	AM	3 205 +00		<u> </u>	AN S	1.80E+05		na
1.4-Dichlorobenzene	ΔN	2.29L-100		B D	¥.	3.61E+04		na
		3.UOE-UI		na	ΑA	6.61E+05		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

		Cartrid	ge, 0.50 ca DO	aliber OIC:	Cartridge, 0.50 caliber, Blank, M1A1 (M2) DODIC: A559	A1 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Benzyl Chloride	NA	3.96E-02		Вa	AN	5.20E+03		92
1,2-Dichlorobenzene	NA	2.09E+02		na	AN AN	3.01E+05		2 2
Hexachlorethane	NA	4.80E-01		В	AN AN	2.90E+04		2 2
1,2,4-Trichlorobenzene	NA	2.08E+02		na	¥N	3.71E+04		5 6
Hexachlorobutadiene	NA	8.73E-02		na	NA	3.21E+04		E E
Hydrocarbons								
Methane	4.55E-02.	N		E	3 87F+01	3 30E+08	1 17E OF	2
Ethylene	4.55E-03	N/		ē	3.87E+00	4 60F+05	8 40E-08	2 2
Acetylene	2.44E-03	N		ē	5.19E-01	NA	0.101-00	2 2
Ethane	NA	N		a	NA	AN		ם מ
Propylene	NA	ΛN		na	Ą	NA		2 2
Propane	AN	N/		ē	NA V	3.78E+06		2 2
Propyne (methyl acetylene)	NA	ΛN		g	NA	2.79E+06		2 2
Isobutane	NA	NV		na	AN	9.52E+05		2 2
1-Butene/Isobutylene (115-11-7)	NA	ΛN		ra	AN	6.87E+06		2 6
1,3-Butadiene/butane	NA	3.74E-03		na	Ą	2.20E+04		Da L
cis-butene	NA	SN.		na	NA	1.72E+04		g
1-Butyne	NA	N<		na	NA	ΑN		na
trans-Butene	NA NA	≥N		na	NA	1.72E+04		na
Z-Butyne (crotonylene)	NA:	2		na	AN	NA		na
n-Pentane	NA P	N		па	NA	1.80E+06		na
n-hexane	3.49E-03	2.10E+02	1.66E-05	2	2.96E+00	5.28E+05	5.62E-06	2
SOOAC STATE								
H-muosodinemylamine	AA.	1.37E-04		na	ΔA	2.50E+03		na
Dis(z-critoroethyr)etner	Y.	5.82E-03		na	ΑN	5.85E+04		na
louand	ΑΝ	2.19E+03		na	ΑΝ	3.85E+04		na
z-cnloropnenol	NA	1.83E+01		na	NA	5.25E+03		na
1,3-Dichlorobenzene	NA NA	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	NA	3.06E-01		па	ΑN	6.61E+05		na
i,z-uicinoropenzene	YA.	2.09E+02		па	Z A	3.01E+05		na
Derizyi alconol	NA	1.10E+03		na	NA NA	5.53E+04		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

		Cartrio	ige, 0.50 c DC	all ber	Cartridge, 0.50 caliber, Blank, M1A1 (M2) DODIC: A559	A1 (M2)		:.'
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
bis(2-chlorolsopropyl)ether	ΑN	1.92E-01		na	Ā	6.99F+04		2
2-methylphenol	NA	1.83E+02		na	NA	NA		2 2
hexachloroethane	AN	4.80E-01		na	NA NA	2 90F+04		2 2
n-nitroso-di-n-propylamine	NA	9.61E-04		na	¥	2.00F+02		2 2
4-methylphenol	NA	1.83E+02		na	¥	NA		2 2
nitrobenzene	NA	2.09E+00		E	¥	1.51E+04		2 2
isophorone	NA	7.08E+00		Ba	AN	2.83E+04		2 0
2-nitrophenol	NA	NV		æ	4 V	NA		2 2
2,4-dimethylphenol	VA	7.30E+01		na	AN	NA NA		2 2
bis(2-chloroethoxy)methane	NA	N N		na	¥	NA		0 0
2,4-dichlorophenol	NA	1.10E+01		na	AN	3.00E+04		2 0
1,2,4-trichlorobenzene	NA	2.08E+02		na	₹ Z	3 71F+04		2 2
naphthalene	3.74E-04	3.13E+00	1.19E-04	2	3.18E-01	7.86E+04	4.04E-06	g 5
4-chloroaniline	Ϋ́	1.46E+01		na	Ą	3.00E+04		2 2
nexachlorobutadiene	AN A	8.62E-02		na	AA	3.21E+04		9
4-chloro-3-methylphenol	NA NA	NV		Вã	AN	2.00E+04		2 2
2-methylnaphthalene	¥	7.30E+01		na	ΑΝ	2.00E+04		2
nexachlorocyclopentadiene	AN A	7.30E-02		na	ΑN	2.23E+02		2 2
Z,4,6-trichlorophenol	ΨN	1.10E+02		na	Y.	3.00E+04		2
2,4,5-trichlorophenol	¥.	3.65E+02		na	NA	3.00E+04		g
2-chiloronima 2-nitroanima	¥ S	2.92E+02		В	NA	6.00E+02		æ
Acenaphtylene	X X	Z.U9E-U1		힐	¥	AA		na
dimethylphthalate	V.	NA 2 RELIGIA		<u>ا</u> ع	. WA	2.00E+02		na
2 6-dinitrotoliana	S S	9.035.704		E E	¥	1.50E+04		na
acenanhthene	V.	3.00=+00		g	ΑΝ	6.00E+02		na
on a contraction of the contract	ZN.	Z.19E+0Z		g	۸A	1.25E+03		na
2 A divisional	AN S	N		na	AN	NA		na
diposeding.	WA	7.30E+00		na	NA NA	7.50E+03		na
arbertzoluran 2.4 distract	WA	1.46E+01		па	۸N	NA		Ва
z,4-umirotonuene	V.	7.30E+00		na	NA	6.00E+02		na
Charaga	Y S	2.92E+01		na	۷N	3.00E+04		na
rigorene	NA	1.46E+02		na	۷A	7.50E+04		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

			DODIC: A559	DODIC: A559	A559			
Compound	C _{chronle} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
4-chlorophenyl-phenylether	AN	N		na	ΑN	NA		2
diethylphthalate	NA	2.92E+03		na	¥	1.50E+04		2 2
4-nitroaniline	NA	N		na	ž	9.00E+03		2 2
. 4,6-dinitro-2-methylphenol	AN	3.65E-01		na	¥2	5 00E+02		2 2
n-nitrosodlphenylamine(1)	NA	1.37E+00		na	¥.	NA		2 2
4-bromophenyl-phenylether	NA	N		Б	AN	NA NA		2 2
hexachlorobenzene	ΑΝ	4.18E-03		g	AN	7.50E+01		2 2
pentachlorophenol	ΑN	5.60E-02		na	¥	1.50E+03		E
phenanthrene	AN .	N		na	AN	2.00E+03		e
anthracene	AN.	1.10E+03		na	NA	6.00E+03		na
di-n-butyiphthalate	ΨN	3.65E+02		na	NA	1.50E+04		na
fluoranthene	AA	1.46E+02		na	ΑN	3.00E+01		na
pyrene	Ϋ́	1.10E+02		na	AN A	1.50E+04		na n
butylbenzylphthalate	ΑΝ	7.30E+02		na	NA	5.00E+05		na
penzo(a)anthracene	A'A	2.17E-02		na	NA	6.00E+02		na
chrysene	¥	2.17E+00		na	ΝΑ	2.00E+02		na
3,3-dichlorobenzidine	NA	1.50E-02		na	NA	6.21E+03		na
bis(2-ethythexyl)phthalate	NA VA	4.80E-01		na	ΨV	1.00E+04		E
di-n-octylphthalate	ΑN	7.30E+01		na	ΑN	1.50E+05		na Da
benzo(b)fluoranthene	NA	2.17E-02		na	A'N	AN		E
benzo(k)fluoranthene	¥N.	2.17E-01		na	NA	NA		па
penzo(a)pyrene	ΨZ.	2.17E-03		Ē	NA NA	7.50E+03		na
Indend(1,2,3-cd)pyrene	¥.	2.17E-02		na	NA	NA		na
dibenz(a,n)antinracene	¥	2.17E-03		na	NA	3.00E+04		na
benzo(g,h,i)perylene	Y.	N		na	NA	3.00E+04		na
TO.13 (PAHe)								
nanhthalana	4 RRE 04	0 40 0	700 7					
orobith/dagae	1.00E-04	3.135+00	5.32E-05	2	1.41E-01	7.86E+04	1.80E-06	2
Aceriapiitiyierie	0.33E-U6	AN.		na	5.57E-03	2.00E+02	2.79E-05	no
Acenaphrinene	1.72E-07	2.19E+02	3.53E-09	20	6.57E-04	1.25E+03	5.25E-07	2
fluorene	2.01E-06	1.46E+02	1.38E-08	2	1.71E-03	7.50E+04	2.28E-08	2
Pilatialian	1.72E-U0	AN .		na	1.46E-03	2.00E+03	7.29E-07	DO.

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

,		Cartrid	lge, 0.50 c	allber	Cartridge, 0.50 callber, Blank, M1A1 (M2)	41 (M2)		
Compound	C _{chronle} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
anthracene	NA	1.10E+03		na	AN	6.00E+03		2
fluoranthene	2.20E-06	1.46E+02	1.50E-08	2	1.87E-03	3.00E+01	6.23E-05	2
pyrene	2.09E-06	1.10E+02	1.91E-08	2	1.77E-03	1.50E+04	1.18E-07	2
benzo(a)anthracene	NA	2.17E-02		ā	NA NA	6.00E+02		2
chrysene	NA	2.17E+00		na	AN	2.00E+02		2
benzo(b)fluoranthene	NA	2.17E-02		na	NA	AN		la E
benzo(k)fluoranthene	۸N	2.17E-01		na	NA	ΑN		na
Benzo(e)pyrene	ΑN	N		na	NA	NA NA		na
benzo(a)pyrene	¥	2.17E-03		na	NA	7.50E+03		na
Indeno(1,2,3-cd)pyrene	¥	2.17E-02		па	NA	Ϋ́Α		na
dibenz(a,h)anthracene	¥	2.17E-03		na	NA	3.00E+04		na
benzo(g,h,l)perylene	ΑN	≥		na	AN	3.00E+04		na
Dioxins and Furans								
2378-Tetrachlorodibenzo-p-dioxin	NA	4.48E-08		na	AN	3.50E+00		na
12378-Pentachlorodibenzo-p-dioxin	¥	NV		na	ΑN	2.50E+00		na
123478-Hexachlorodibenzo-p-dioxin	ΑΝ	NV		ВE	AN	AN		na E
123678-Hexachlorodibenzo-p-dioxin	NA A	N		na	ΝA	1.50E+01		na
123789-Hexachlorodibenzo-p-dioxin	ΔA	1.48E-06		na	ΑΝ	NA NA		na
1234678-Heptachlorodibenzo-p-dioxin	6.27E-11	N		na	1.33E-08	AN		na
Octachlorodibenzo(p)dioxin	1.13E-09	N		na	9.57E-07	1.50E+02	6.38E-09	2
2378-Tetrachlorodibenzo-p-furan	AN	N		na	NA	2.00E+00		na
12378-Pentachiorodibenzo-p-turan	AA :	≥N.		na	NA	NA		na
400479 Herriacillorodipenzo-o-turan	NA.	A.		na	NA	7.50E-02		na
1234/8-Hexacniorogipenzo-p-furan	AA .	2		шa	NA	7.50E+00		g
123070-riexacniorogipenzo-p-ruran	NA.	NN.		na	NA A	2.50E+00		na
123/89-Hexachlorodibenzo-p-furan	VA V	N N		g	NA	NA		na
2346/8-Hexachlorodibenzo-p-furan	ΑA	N		g	NA	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	1.20E-11	≥		na	2.55E-09	AN		na
1234789-Heptachlorodibenzo-p-furan	AA	N		na	ΑN	NA		na
Octachlorodibenzofuran	1.82E-10	N		na.	1.55E-07	3.00E+02	5.16E-10	2
Energetics								
Nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200 meter location

		Cartrid	ge, 0.50 ca DO	0 caliber, Blar DODIC: A559	Cartridge, 0.50 caliber, Blank, M1A1 (M2) DODIC: A559	11 (M2)		
Č	Cchronle	Health-Based	ن		C	Acute Toxicity		
Compound	(_E m/grl)	Screening Level (ug/m³)	Cehronic, HBSL	> 1?	(µg/m³)	Value (tua/m³)	Cacute/ ATV	> 12
						(mgd)		
z-Nitrotoluene	NA	3.65E+01		na	NA	Ν		2
3-Nitrotoluene	NA	3.65E+01		na	ΑN	NA		3 6
4-Nitrotoluene	ΑN	3.65E+01		na	ΑN	3 37E±04		<u> </u>
Nitroglycerine	NA	4.80E-01		2	ΝΑ	NA		<u>a</u>
1,3-Dinitrobenzene	NA	3.65E-01		2 2		ZA1		2
2,6-Dinitrotoluene	AN	3 REELOO		<u>a</u>	\$.	3.00E+03		na
2 4-Dinitrotoliene	V.V	2.000.00		<u>a</u>	NA	6.00E+02		па
	Y.	/.30E+00		na	₹	6.00E+02		82
1,3,5-1 rinitrobenzene	NA	1.10E+02		na	¥	3.00E+04		2
2,4,6-Trinitrotoluene	¥.	2.24E-01		<u>e</u> 2	NA	2 50E±04		2
RDX	¥	6.11F-02		2	VIV	Z.00L.104		<u>a</u>
4-Amino-2,6-Dinitrotoluene	NA	NIV.		<u> </u>	£ :	NA		na
2-Amino-2 6-Dinitratolilene	S V	717		g	¥	NA		na
Total	2	ANI		E	¥	1.50E+04		na
CANC	Y.	3.00E+U1		na	NA NA	¥		na
LIMY	¥	1.83E+02		na	۸	Ą		2
Pentaerythritoltetranitrate	NA NA	N		na	Ą	5 00E±01		5 2
Dibutyl Phthalate	ΑN	3.65E+02		2	ΔN	1 505.01		<u>a</u>
Dioctyl Phthalate	¥	4.80F-01		2	S S	1.301.104		g
Diphenylamine	MA	0 125104		<u> </u>	7	1.00E+04		na
Footpotes		\$.10ET01		na	NA	3.00E+04		na
NA = Not applicable because compound								

NA = Not applicable because compound was not detected

NV = No value available

Cchronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

>1? = Is the ratio greater than one?

na = Not available because health-based sceening value is not available or not applicable if compound was not detected

Sacute = average acute concentration

ATV = Acute toxicity value

Table D-4: Comparison of Modeled Air Concentrations with Health-Based Values: Total Petroleum Hydrocarbons - 200 meter location

	G	Contribution O 50 colliber District and A 4 section	A. Diamir Black on	
	5	DODIC	DODIC: A559	(Z)
Commoning	Cchronle	Cehronte	Cchronic	Cehrante
	(hg/m³)	(hg/m³)	(ng/m³)	(m/brl)
	Aliphatic:C<=8	Aliphatic:C>8	Aromatic:C<=8	Aromatic:C>8
Hexane	3.12E-03	NA	AN	NA
Benzene	NA	NA	2.84E-03	NA
Toluene	NA	NA	1.53E-04	NA
m&p-Xylene	NA	NA	1.07E-04	NA
Styrene	NA	NA	NA	1.05E-04
n-Hexane	3.49E-03	NA	NA	NA
naphthalene	NA	AN	AN	3.74E-04
naphthalene	NA	AN	AN	1.66E-04
acenaphthylene	NA	NA	AN	6.55E-06
Acenaphthene	NA	NA	NA	7.72E-07
fluorene	NA	NA	NA	2.01E-06
phenanthrene	NA	NA	NA	1.72E-06
fluoranthene	NA	NA	NA	2.20E-06
Total (µg/m³)	6.61E-03	0.00E+00	3.10E-03	6.58F-04
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	3.44E-07	0.00E+00	7.43E-06	3.16E-06
>12	no	ou	ou	
-ootnotes:				
•1? = Is the ratio greater than one?				
AA = Not Applicable because compound was not detected				
Schronic = chronic averaged air Concentration				
HBSL = Health-Based Screening Level				

APPENDIX E

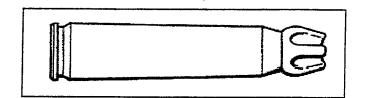
FACT SHEET SUBMITTED TO THE U.S. ARMY ENVIRONMENTAL CENTER

U.S. Army Environmental Center Training Munitions Fact Sheet

M1A1 .50 Caliber Blank Cartridge

Department of Defense Identification Code: A559

Breathing air emissions from the M1A1 .50 caliber blank cartridge will not impact the health of residents who live as close as 200 meters (656 feet) from the firing location.



To be fully prepared to protect our country, U.S. soldiers must train with many different weapons and munitions, including the M1A1 .50 caliber blank cartridge. This training is important because it helps prepare our soldiers for a variety of combat situations. While the Army recognizes the value of such comprehensive training on our installations, we also work hard to ensure the safety and health of surrounding communities.

WILL BREATHING AIR EMISSIONS FROM THE M1A1 .50 CALIBER BLANK CARTRIDGE AFFECT MY HEALTH?

To answer this question, the U.S. Army tested the air emissions that are released when the M1A1 is fired. The information gathered during these tests was then analyzed to determine if there would be a potential for health effects from inhalation to residents who live near training areas. Study results, generated using conservative methods, showed that offsite residents breathing air as close as 200 meters (656 feet or about the length of two football fields) from the firing location are safe from these emissions. If offsite residents are located less than 200 meters from the firing locations, a more site-specific evaluation would be necessary. It should be noted that at most locations, training areas are at least 1,000 meters (over half a mile) away from populated areas and the distance to firing locations may be even farther.

How Was The Study Conducted?

To gather data for this study, the M1A1 was fired from the M2 machine gun in a test chamber. The air in the chamber was then tested to identify the types and amounts of substances released. About 300 different substances were looked for during this part of the study.

This information was then used in an U.S. Environmental Protection Agency (USEPA) approved air model (a computer program that allows estimation of air concentrations) to determine the amount of each substance to which someone

living near a training site might be exposed. Downwind concentrations were estimated based on a typical use scenario for the M1A1 during training exercises. Since this study did not look at any one specific training area, the assumptions used in the model would, in most cases, predict higher downwind air concentrations than those expected at an actual training site.

These estimated air concentrations were then compared to screening levels established by the USEPA and other federal agencies. If the air concentrations are less than these screening levels, they are considered safe for the general population, including sensitive people such as the sick, elderly, and children.

WHAT ARE THE STUDY LIMITATIONS?

Many steps were taken to ensure that the results of this study are protective of residents who live near training facilities. However, as with any study, this study has limitations. For example, the study does not consider exposure to other types of munitions that could also be used during the same training event. Due to these limitations, conservative model conditions were used to ensure the protection of public health from breathing M1A1 air emissions.

WHAT EXACTLY IS THE M1A1 .50 CALIBER BLANK CARTRIDGE?

The M1A1 is a blank cartridge used only in training. It has no projectile and is used to simulate firing in training exercises. To use the M1A1, a device is attached to the weapon allowing for firing of blank ammunition. The M1A1 consists of a brass cartridge case and contains a propelling charge made up primarily of nitrocellulose and nitroglycerine. Nitrocellulose is commonly used in furniture lacquers, printing inks, nail polish, and as a primary ingredient in smokeless propellants for military and commercial use. Nitroglycerin is a component of dynamite and is used for military and industrial purposes such as mining and demolition. The M1A1 cartridge can be identified by the rosette crimp at the mouth and absence of a bullet.

WHERE CAN I GET MORE INFORMATION?

For more information on the M1A1 or other military munitions, please call the Army Environmental Hotline at 1-800-USA-3845, visit our Web site at www.aec.army.mil, or e-mail t2hotline@aec.apgea.army.mil.